

Cost-Benefit Analysis: An Inadequate Basis for Health, Safety, and Environmental Regulatory Decisionmaking*

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INTRODUCTION

The use of cost-benefit analysis in agency decisionmaking has been hailed as the cure for numerous dissatisfactions with governmental regulation. Using this form of economic analysis arguably promotes rational decisionmaking and prevents health, safety, and environmental regulations from having inflationary and other adverse economic impacts. Closer analysis, however, reveals that the cost-benefit approach to regulatory decisionmaking suffers from major methodological limitations and institutional abuses. In practice, regulatory uses of cost-benefit analysis stifle and obstruct the achievement of legislated health, safety, and environmental goals.

This Article critically reviews the methodological limitations of cost-benefit analysis, current agency uses of cost-benefit analysis under statutory requirements, the impact of recent Executive orders mandating economic balancing analyses for all major regulatory agency decisions, and agency efforts to structure their discretion in the use of cost-benefit analysis. The Article concludes that if the health, safety, and environmental regulators continue to use cost-benefit analysis, proce-

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dural reforms are needed to promote greater accountability and public participation in the decisionmaking process. Further, to the extent that economic factors are permissible considerations under enabling statutes, agencies should conduct cost-effectiveness analysis, which aids in determining the least costly means to designated goals, rather than cost-benefit analysis, which improperly determines regulatory ends as well as means.

I

COST-BENEFIT ANALYSIS AS A MEANS TO STRUCTURE AGENCY DISCRETION

A. Delegation of Authority to Achieve Multiple Objectives

In response to increasing concerns about risks to health, safety, and environmental quality, Congress has enacted several statutes¹ pro-

1. Health, safety, and environmental provisions requiring regulatory and public works agencies to weigh multiple considerations before taking action include the following: Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C.A. § 136(bb) (West Supp. 1979) (determination that a pesticide has "unreasonable adverse effects" takes into account the economic, social, and environmental costs and benefits of its use); Consumer Product Safety Act, 15 U.S.C. § 2058(c) (1976) (promulgation of safety rules requires consideration of the risks of injury, number of products subject to the rule, public need for the product, probable effect of the rule on utility, cost, and availability of the product, and means of minimizing adverse effects on competition and manufacturing); *id.* § 2076(m)(4)(A)(i) (West Supp. 1979) (product safety standards must take into account the cost impact on and benefit to consumers and affected businesses); Toxic Substances Control Act, 15 U.S.C. § 2601(c) (1976) (Environmental Protection Agency (EPA) Administrator required to consider environmental, economic, and social impact of actions); National Forest Management Act of 1976, 16 U.S.C. §§ 1604(1) and 1606(d) (1976) (process must be devised to assess costs and benefits of reforestation, timber stand improvement, and sale of timber); Soil and Water Resources Conservation Act of 1977, 16 U.S.C. § 2005(a)(7) (Supp. I 1979) (development of conservation program shall analyze costs and benefits of alternatives); Clean Water Act § 303(c)(2), 33 U.S.C. § 1313(c)(2) (1976) (establishment of state water quality standards requires consideration of public health and safety, the waters' value for public supply, fish and wildlife propagation, and recreational, agricultural, industrial, and navigational uses); *id.* § 304(b)(1), 33 U.S.C. § 1314(b)(1) (determination of best practicable pollution control measures must consider cost of technology, age of equipment and facilities, engineering aspects, and nonwater quality environmental impact); *id.* § 315(a), 33 U.S.C. § 1325(a) (National Study Commission to evaluate social, economic, and environmental effects of achieving or not achieving effluent limitations); Water Resources Planning Act and Water Resources Development Act of 1974, 42 U.S.C. §§ 1962-2, 1962d-5e, 1962d-17 (1976) (congressional intent of assessing regional and national economic development and environmental protection in evaluating costs and benefits of water resource projects; establishment of wetlands authorized if environmental, economic, and social benefits justify increased costs; discount rate set for regional or river basin plans); National Environmental Policy Act of 1969, § 102(2)(B), 42 U.S.C. § 4332(2)(B) (1976) (all federal agencies required to give appropriate consideration to environmental values along with economic and technical factors); Solar Energy Research, Development, and Demonstration Act of 1974, 42 U.S.C. § 5556(b) (1976) (cost-benefit analysis required to demonstrate successful solar energy development program); Energy Reorganization Act of 1974, 42 U.S.C. § 5877(c) (1976) (Nuclear Regulatory Commission (NRC) must state goals and priorities related to costs, benefits, and risks of commercial nuclear power); Energy Conservation Standards for New Buildings Act of 1976,

viding new schemes for agency decisionmaking. These statutes specify the problems to be addressed and the procedures to be followed, but provide little guidance on the analytical processes the federal agency should use in reaching regulatory decisions.

The statutes typically prescribe a variety of general policy objectives, decisional criteria, and legislative findings to guide the agency in dealing with the substantive aspects of its decisionmaking. These factors usually fall into two competing categories: (1) the reduction of certain risks to health, safety, or environmental quality; and (2) the minimization of adverse economic effects on regulated entities, their employees, and consumers. In addition, an agency may be required to consider using the best practicable or available technology to reduce risks, promote energy conservation or national security, protect the small business sector, or encourage innovation.

Agencies must also consider the additional, and often inconsistent, objectives and requirements imposed by other statutes.² Operating with limited resources and conflicting objectives, federal agencies must therefore "make policy when Congress could make none" and afford "a fair degree of predictability of decision in the great majority of cases and of intelligibility in all."³

The statutes are usually silent as to the analytical method by which

42 U.S.C. § 6839 (Supp. I 1977) (energy conservation performance standards must take into account efficiency, economic cost and benefit, and impacts upon affected groups); Clean Air Act, § 109(d)(2)(C), 42 U.S.C. § 7409(d)(2)(C) (Supp. I 1977) (scientific review committee to advise EPA Administrator of adverse public health, welfare, social, economic, and energy effects of attainment strategies for ambient air quality standards); *id.* § 111(a)(1)(C), 42 U.S.C. § 7411(a)(1)(C) (existing source performance standards to be established with reference to best technological system, with consideration of cost, nonair quality health and environmental impacts, and energy requirements); *id.* § 164(b)(1)(A), 42 U.S.C. § 7474(b)(1)(A) (description and analysis of health, environmental, economic, social, and energy effects required prior to air quality area redesignation); *id.* § 202(a)(3)(A) (i), (iii), 42 U.S.C. § 7521(a)(3)(A)(i), (iii) (motor vehicle emission standards to be established by considering cost, noise, energy, and safety effects of emission reduction); *id.* § 211(c)(2)(B), 42 U.S.C.A. § 7545(c)(2)(B) (West Supp. 1979) (cost-benefit analysis required for emission control devices before control or prohibition of certain fuels or fuel additives).

2. See NATIONAL ACADEMY OF SCIENCES, DECISION MAKING FOR REGULATING CHEMICALS IN THE ENVIRONMENT 17-22 (1975) [hereinafter cited as CHEMICALS REPORT].

3. Friendly, *The Federal Administrative Agencies: The Need for a Better Definition of Standards*, 75 HARV. L. REV. 873, 874 (1962). Although structuring discretion to accommodate multiple considerations in decisionmaking has not received sufficient congressional attention, there are recent indications of congressional concern over excessive delegation. See SENATE COMM. ON GOVERNMENTAL AFFAIRS, 95TH CONG., 1ST SESS., 5 STUDY ON FEDERAL REGULATION (Comm. Print 1977), which recommends, in part: "The mandates of the independent regulatory agencies should be drafted by Congress in as narrow and specific a manner as possible. Where broad delegations of authority are determined by Congress to be unavoidable, congressional oversight of subsequent agency action should be significantly increased." *Id.* at XIII. See also letter from Senator Edmund Muskie to Comptroller General Elmer Staats (Aug. 5, 1977), reprinted in GENERAL ACCOUNTING OFFICE, IMPROVED FORMULATION AND PRESENTATION OF WATER RESOURCES PROJECT ALTERNATIVES PROVIDE A BASIS FOR BETTER MANAGEMENT DECISIONS 18 (Feb. 1, 1978) [hereinafter cited as

the agency must balance these diverse factors. At most, Congress occasionally specifies that certain factors are subordinate to others.⁴ As a result, Congress delegates considerable discretion to the agency to structure the central feature of its decisionmaking—the balancing of multiple objectives necessary to reach a decision.⁵

Judicial review of agency action ensures compliance with express or implied statutory balancing requirements. According to the District of Columbia Circuit, for example, the National Environmental Policy Act of 1969 (NEPA)⁶ requires agencies to use a “case by case balancing judgment” in which “the particular economic and technical benefits of planned action must be assessed and then weighed against the environmental costs.”⁷ This court also construed the Safe Drinking Water Act,⁸ a statute generally assumed to promote the single objective of public health, to require a balancing of multiple considerations.⁹

Muskie letter to GAO] (requesting a report describing how the Corps of Engineers and other water resource agencies limit their discretion in decisionmaking).

Economists, engineers, and other analysts of public sector decisionmaking are addressing the multiple objective problem. See R. KEENEY & H. RAIFFA, DECISIONS WITH MULTIPLE OBJECTIVES: PREFERENCES AND VALUE TRADE-OFFS (1976); E. STOKEY & R. ZECKHAUSER, A PRIMER FOR POLICY ANALYSIS (1978) [hereinafter cited as STOKEY & ZECKHAUSER].

4. See, e.g., Clean Air Act § 317(e), 42 U.S.C. § 7617(e) (1976) (consideration of economic effects does not lessen the Administrator's duty to protect public health and welfare).

5. Judge Bazelon has observed:

Traditionally, in democratic societies, it is elected legislatures that make the hard value choices. Indeed, this is precisely what legislatures are designed to do. Increasingly, however, our legislatures have been delegating these value choices to administrative agencies—institutions which cannot resolve value conflicts through the relatively simple expedient of a show of hands.

D. Bazelon, Coping with Technology Through the Legal Process 12 (Jan. 10, 1977) (paper presented at Atomic Industrial Forum, Inc., Conference on United States Energy Policy, Washington, D.C.). See also Battelle Pacific Northwest Labs, Review of Decision Methodologies for Evaluating Regulatory Actions Affecting Public Health and Safety (Dec. 1976) [hereinafter cited as Battelle Report]. The report states:

The most significant feature of the legal setting for health and safety regulations is that both Congress and the courts give the agencies broad discretion in making decisions. With few exceptions . . . , Congress has simply told the agencies to protect public health and safety and has not indicated guidelines for acceptable incremental safety expenditures or ways to determine an acceptable approach.

Id. at ix. See also CHEMICALS REPORT, *supra* note 2, at 11-22.

6. 42 U.S.C.A. §§ 4321-4368 (West Supp. 1979).

7. Calvert Cliffs' Coordinating Comm'n v. AEC, 449 F.2d 1109, 1123 (D.C. Cir. 1971).

8. 42 U.S.C.A. §§ 300f-300j-10 (West Supp. 1974-1978).

9. Environmental Defense Fund v. Costle, 578 F.2d 337 (D.C. Cir. 1978). The court observed:

The task of the agency here is largely one of line drawing. Agency expertise and judgment must be applied in determining the optimal balance between promotion of the public welfare and avoidance of unnecessary expense. [The court] will not interfere so long as the agency strikes a balance that reasonable [*sic*] promotes the legislative purpose.

Id. at 346.

Similarly, the Fifth Circuit construed the Occupational Safety and Health Act, 29

There is, however, no consensus as to how courts should review agency balancing. Judge Leventhal believed that the judiciary should play a central role in "ensuring the principled integration and balanced assessment of environmental and nonenvironmental considerations in federal agency decisionmaking."¹⁰

[T]o the extent that special knowledge [is] involved, it [is] the knowledge of how matters are proven, and that is a field in which courts have always had a special interest and in which they cannot escape keeping up with the scientific times. . . . There may be recondite problems on the frontier of statistical and probability theory that a court cannot meaningfully handle. Basically, however, a court can, by diligence and attentiveness, address itself to issues of how matters are proven, even though understanding such issues may involve some inkling of statistical significance.¹¹

In contrast to Judge Leventhal's urging that courts evaluate the substantive and analytical aspects of agency decisionmaking, Judge Bazelon concludes that courts should defer to the scientific and technological determinations and value preferences of the agencies. Instead, "the important thing is that the agency generate a record in which the factual issues are fully developed" in order to "make possible effective professional peer review, as well as legislative and public oversight."¹²

As a result of these statutory and judicial attitudes about balancing, regulatory agencies have sought to develop new techniques for structuring their discretion. Most of these techniques are variations on the theme of cost-benefit analysis.

B. Use of Cost-Benefit Analysis

1. Defining Cost-Benefit Analysis

Cost-benefit analysis derives from simple profit and loss accounting traditionally practiced by business organizations.¹³ Cost-benefit analysis

involves translating the attribute performances of alternatives into dollar quantities. The favorable attribute performances are added to-

U.S.C. § 652(8) (1976), to require that the Occupational Safety and Health Administration (OSHA) justify its workplace health standard for benzene by demonstrating a reasonable relationship between the quantified costs and benefits of the proposed regulation. *American Petroleum Institute v. OSHA*, 581 F.2d 493, 503-05 (5th Cir. 1978), cert. granted sub. nom. *Marshall v. American Petroleum Institute*, 440 U.S. 906 (1979).

10. Leventhal, *Environmental Decisionmaking and the Role of the Courts*, 122 U. PA. L. REV. 509, 555 (1974).

11. *Id.* at 533.

12. D. Bazelon, *supra* note 5, at 8. But see *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, 435 U.S. 519 (1978), in which the Supreme Court limited the authority of federal courts to require procedures beyond those provided by the Administrative Procedure Act, 5 U.S.C. §§ 500-700 (1976). See note 22 *infra*.

13. See E.J. MISHAN, *COST BENEFIT ANALYSIS* 6 (1973).

gether to become the benefits. The sum of the unfavorable attribute performances is the cost. Thus, the cost-benefit analysis can be viewed as a process of deriving dollar values for each entry in a performance matrix and aggregating all of the performances into one attribute, either net benefits (benefit minus cost) or a benefit to cost ratio.¹⁴

A decision is justifiable when net benefit is positive or a benefit-to-cost ratio is greater than one.

Policy analysts have broadened the meaning of cost-benefit analysis to encompass virtually any analytical method that organizes information on alternative courses of action or displays possible trade-off opportunities, thereby structuring decisionmaking.¹⁵ Thus, the cost-benefit rubric encompasses many different types of analyses. Some of these analyses simply adopt a previously determined objective, leaving only the "cost" side of the balance sheet to be developed. For example, in establishing an emission standard for the discharge of ionizing radiation from a nuclear reactor, an analyst may be "given" a preexisting standard for the ambient level of radiation necessary to protect human health near the reactor. This standard represents a conclusive determination of the degree of societal benefit to be achieved and reduces the analyst's task to finding the most cost-effective method to meet the ambient standard. Hence, the analysis in this truncated format is a simpler task of cost-effectiveness analysis. *Cost-benefit analysis*, then, is used by the decisionmaker to establish societal goals as well as the means for achieving these goals, whereas *cost-effectiveness analysis* only compares alternative means for achieving "given" goals.¹⁶ This Article focuses on cost-benefit analysis.

14. Battelle Report, *supra* note 5, at 53. See also STOKEY & ZECKHAUSER, *supra* note 3, at 136-37.

15. See CHEMICALS REPORT, *supra* note 2, at 39:

Benefit-cost analysis . . . is not a rule or formula which would make the decision or predetermine the choice for the decision maker. Rather, it refers to the systematic analysis and evaluation of alternative courses of action drawing upon the analytical tools and insights provided by economics and decision theory. It is a framework and a set of procedures to help organize the available information, display trade-offs, and point out uncertainties. . . .

Cost-benefit analysis is thought to simplify decisions "by reducing the relevant factors to numbers that can be added, subtracted and compared. The only unit generally considered feasible for doing this is the dollar, but the use of dollar values poses a great many problems." *Id.* at 41. See also Battelle Report, *supra* note 5; W. ROWE, AN ANATOMY OF RISK (1975); and E.J. MISHAN, *supra* note 13. For a lucid review of 16 techniques for analyzing and improving systems frequently used in the data and organization stages of cost-benefit analysis, see A.L. McCauley, Statistics-Based Systems Techniques: Concepts, Examples, Applications (Feb. 16, 1972) (IBM Data Processing Technical Publication).

16. See discussion of this distinction in Baram, *Legal and Institutional Aspects of Using Benefit-Cost Analysis to Control Ionizing Radiation*, in CONSIDERATIONS OF HEALTH BENEFIT-COST ANALYSIS FOR ACTIVITIES INVOLVING IONIZING RADIATION EXPOSURE AND ALTERNATIVES 107-12 (1977) (EPA Rep. No. 520/4-77-003) [hereinafter cited as RADIATION REPORT]. See also Weinberg, *Benefit-Cost Analysis and the Linear Hypothesis*, 271 NATURE 596 (1978).

2. Adoption of Cost-Benefit Analysis by Federal Agencies

The continuing efforts of regulatory agencies to balance competing considerations,¹⁷ such as public health and economic feasibility, are beset by a number of special problems. The technical problems include an ever-expanding, but limited and generally inconclusive data base,¹⁸ disagreement among experts on methods for using data, lack of consensus as to findings and their applicability to problems at hand, and unquantifiable attributes. Regulators must also value low probability, high cost events while taking into consideration the diverse and changing values of our pluralistic society.¹⁹ Moreover, an atmosphere of "crisis management" is promoted by statutory time limitations and pressures from various interests.

Mandated by statutes²⁰ and recent Executive orders²¹ to conduct complex "balancing analyses" to reach decisions, regulatory agencies are under considerable pressure to adopt cost-benefit analysis.²² The

17. Public works agencies have used cost-benefit analysis since the late 19th century. M. Baram, *Federal Energy Regulation and the Use of Cost-Benefit Analysis: Legal and Public Policy Considerations* 1-8 (Oct. 1, 1977) (Report to Environmental Policy Office, Brookhaven National Laboratory) [hereinafter cited as Brookhaven Report]; J. Tarr & F. McMichael, *The Evolution of Wastewater Technology and the Development of State Regulation: A Retrospective Analysis* in RETROSPECTIVE TECHNOLOGY ASSESSMENT—1976, at 165 (J. Tarr ed. 1977). Congress specifically approved the technique in water resource development projects in 1936 (Flood Control Act of 1936, 33 U.S.C.A. §§ 701-709(a) (West Supp. 1979)), and most federal public works agencies adopted cost-benefit analysis soon afterward. This early use of cost-benefit analysis by public works agencies was deficient in several respects. For example, the agencies failed to consider environmental costs and applied inadequately low interest rates to discount future benefits and costs to present values. See Roberts, *Benefit-Cost Analysis: Its Use (Misuse) in Evaluating Water Resource Projects*, 14 AM. BUS. L.J. 73, 81-83 (1976); R. Mikesell, *The Rate of Discount for Evaluating Public Projects* (1977) (American Enterprise Institute for Public Policy Research); and U. Kim, *A Benefit-Cost Approach to Water Resource Investments: Theory and Its Application* (Sept. 1977) (unpublished paper, Dep't of Economics and Business Management, Cath. U., Washington, D.C.). The enactment of the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C.A. §§ 4321-4368 (West Supp. 1979), and an increased discount rate have partially alleviated this problem. See Roberts, *supra*. See also U.S. Comptroller General, *Survey of Use by Federal Agencies of the Discounting Technique in Evaluating Future Programs* (Jan. 28, 1968) (Report to the Joint Economic Committee).

18. See, e.g., Chalfant, Hartmann & Blakeboro, *Recombinant DNA: A Case Study in Regulation of Scientific Research*, 8 ECOLOGY L.Q. 55 (1979) [hereinafter cited as *Recombinant DNA*]. For background on decisionmaking from an uncertain data base, see W. LOWRENCE, *OF ACCEPTABLE RISK* (1976), Battelle Report, *supra* note 5, and CHEMICALS REPORT, *supra* note 2.

19. For a more detailed description of problems associated with societal values, such as public preference for voluntary over involuntary risks, see *Recombinant DNA*, *supra* note 18, at 59-60, 81-83.

20. See note 1 *supra*.

21. Exec. Order No. 11,821, 3 C.F.R. 926 (1971-1975 Compilation), amended by Exec. Order No. 11,949, 42 Fed. Reg. 1017 (1976); Exec. Order No. 12,044, 3 C.F.R. 152 (1978 Compilation).

22. However, the courts have given the regulatory agencies a relatively free hand to establish procedures for conducting cost-benefit analysis. See Vermont Yankee Nuclear

use of cost-benefit analysis in regulatory decision processes has been promoted by economic consultants and advisory committees to the agencies drawn from the scientific and engineering communities, including the National Academy of Sciences.²³ In addition, regulated industries have urged agencies to use cost-benefit analysis in considering the economic impacts of regulations. Their efforts include challenging agency actions not premised on cost-benefit analysis in lawsuits, lobbying for amendments to existing statutes to require agencies to engage in cost-benefit analysis, conducting studies demonstrating the inflationary and other adverse economic effects of agency decisionmaking not premised on cost-benefit analysis, and advertising campaigns against regulation conducted without cost-benefit analysis.²⁴ The public also has become increasingly critical of regulation as a cause of societal and economic ills.²⁵ In response to these demands for reform, Presidents Ford and Carter issued several Executive orders requiring agencies to conduct "inflationary impact analyses" and other regulatory analyses of a monetary or economic nature in their major rulemaking activities.²⁶

The increasing pressure upon agencies to use cost-benefit analysis raises a variety of methodological, legal, and public policy issues: quantification of hitherto unquantifiable factors, such as aesthetics, ecological change, and human mortality; the proper degree of congressional, judicial, and public deference to agency decisions; the choice of

Power Corp. v. Natural Resources Defense Council, Inc., 435 U.S. 519 (1978). In that case, the NRDC challenged an AEC rulemaking procedure dealing with spent fuel from a reactor and the use of the rule in cost-benefit analysis for licensing Vermont Yankee's light water reactor. The District of Columbia Court of Appeals overturned the rulemaking because of the AEC's failure to employ certain procedural devices beyond the statutory minima. The Supreme Court held that the circuit court had improperly intruded into the AEC's rulemaking authority and remanded the case.

23. See, e.g., CHEMICALS REPORT, *supra* note 2; L. LAVE & E. SESKIN, AIR POLLUTION AND HUMAN HEALTH, 209-51 (1977); NATIONAL ACADEMY OF SCIENCES, DECISIONMAKING IN THE ENVIRONMENTAL PROTECTION AGENCY (1977); RADIATION REPORT, *supra* note 16; Kletz, *What Risks Should We Run?*, 74 NEW SCIENTIST 320 (1977); Oi, *Safety at Any Price*, REGULATION 16 (Nov./Dec. 1977); Comments of Paul W. MacAvoy, *Government Regulation: Where Do We Go From Here?* (Dec. 19, 1977) (Round table discussion sponsored by American Enterprise Institute for Public Policy Research).

24. See, e.g., Mobil Oil's five-part series on "The Capitalist Revolution" culminating in "A Proposal for Change," which calls for "[a] requirement that clear and unbiased Economic Impact Statements—spelling out their effects on jobs, costs, inflation and the national economy—accompany all new major regulations and legislation." N.Y. Times, July 27, 1978, § A, at 19.

25. A public survey by the National Science Foundation indicates that the public overwhelmingly believes governmental decisionmakers are most at fault when science and technology cause problems. Sixty percent of those surveyed attributed such problems to governmental decisionmakers, only 14% to business decisionmakers, and 12% to the scientific and engineering communities. National Science Board, National Science Foundation, *Science Indicators 1976* (1977).

26. See note 21 *supra*.

discount rates for dealing with future social costs and benefits; constitutional requirements for separation of powers, due process, and equal protection; and potential conflicts between highly specific Executive orders and general statutory requirements. The following sections address the major methodological problems and limitations inherent in cost-benefit analysis, several agencies' experience with cost-benefit analysis, and suggestions for dealing with specific problems.

II

METHODOLOGICAL ISSUES IN REGULATORY USES OF COST-BENEFIT ANALYSIS

Many studies have identified the methodological limitations in the use of cost-benefit analysis as a basis for governmental decisionmaking.²⁷ Nevertheless, regulatory agencies continue to use cost-benefit analysis on many questions that present significant difficulties. The problems discussed in this section are not uniquely attributable to the analytical restraints of cost-benefit analysis, but stem from estimates based on scanty technical facts and the consideration of diverse values. Furthermore, many of the cost-benefit analysis problems are fundamental problems of the regulatory process itself, including good faith objectivity, effective citizen participation, and agency accountability. Other problems arise from unresolved constitutional problems, including the congressional delegation of broad and unguided authority to agencies and presidential intervention to promote consideration of economic factors conflicting with statutory requirements that stress health, safety, or environmental considerations. The following discussion briefly inventories methodological issues²⁸ raised by the use of cost-

27. The literature on cost-benefit analysis is curious in that a typical article will candidly treat the limitations of cost-benefit analysis and warn against overreliance upon its use, but thereafter describe its possible use in a particular situation and finally urge adoption of the results. See, for example, the cautionary beginnings, ambiguous discussion, earnest application, and upbeat conclusions on cost-benefit analysis in the National Academy of Sciences reports cited in notes 2 & 23 *supra*.

In addition to the works cited in notes 5, 13, & 23, *supra*, useful background information is provided by reviewing the following congressional committee studies and reports: JOINT ECONOMIC COMM., 94TH CONG., 2D SESS., FAST BREEDER REACTOR DECISION: AN ANALYSIS OF LIMITS AND THE LIMITS OF ANALYSIS (Comm. Print 1976); SUBCOMM. ON ENERGY AND ENVIRONMENT OF THE HOUSE COMM. ON INTERIOR AND INSULAR AFFAIRS, 94TH CONG., 2d. SESS., PROCEEDINGS OF A CONGRESSIONAL SEMINAR ON LOW-LEVEL IONIZING RADIATION (Comm. Print 1976); SUBCOMM. ON OVERSIGHT AND INVESTIGATIONS OF THE HOUSE COMM. ON INTERSTATE AND FOREIGN COMMERCE, 94TH CONG., 2D SESS., FEDERAL REGULATION AND REGULATORY REFORM (Comm. Print 1976).

28. This Article does not address the theoretical problems underlying cost-benefit analysis. For instance, not every economically efficient policy, one whose benefits exceed its costs, will increase overall social welfare if economic inefficiencies exist in other sectors of the economy. See Lipsey & Lancaster, *The General Theory of Second Best*, 24 REV. ECON. STUD. 11-32 (1956-57).

benefit analysis in regulatory agency decisionmaking.²⁹

A. Inadequate Identification of Costs and Benefits of Proposed Action

One of the first steps in cost-benefit analysis is identifying the implications of regulatory options. Forecasting techniques notoriously fail to identify the possible primary, secondary, and tertiary consequences of a proposed action—particularly if that action sets a standard with diffuse health or environmental consequences that extend geographically and temporally. For example, analysts have great difficulty estimating the specific social and economic costs and benefits of regulatory options for controlling carcinogens.³⁰ Cost-benefit analysis “offers no protection against historically bad assumptions. . . . [F]oolproof techniques for forecasting unforeseen consequences are by definition nonexistent.”³¹

The problem of inadequate or impossible measurement of attributes is related to the deficiencies of forecasting techniques. For instance, the “skimpy science” of toxicity is an acknowledged problem for regulatory officials seeking to measure costs and benefits of possible regulatory options for the control of toxic substances.³² Without the knowledge, techniques, trained personnel, and funds to measure these factors adequately, gross error in estimation may result. Similarly, many environmental effects, such as changes in ecosystems, cannot be

29. For further information on the methodological problems of cost-benefit analysis, see publications cited in notes 2, 5, 13, & 23 *supra*. The author has written extensively on many of these problems. See Brookhaven Report, *supra* note 17, at 1-8; RADIATION REPORT, *supra* note 16; Baram, *An Assessment of the Use of Cost-Benefit Analysis in Regulatory Agency Decision Making*, in RETROSPECTIVE TECHNOLOGY ASSESSMENT—1976, at 15 (J. Tarr ed. 1977); Baram, *Radiation from Nuclear Power Plants: The Need for Congressional Directives*, 14 HARV. J. LEGIS. 905 (1977); Baram, *Regulation of Environmental Carcinogens: Why Cost-Benefit Analysis May Be Harmful to Your Health*, 78 TECH. REV. 41 (1976); *Symposium: Risk-Benefit Assessment in Governmental Decision Making*, 45 GEO. WASH. L. REV. 901 (1977).

30. See D. Rice & T. Hodgson, *Social and Economic Implications of Cancer in the United States* (June 1978) (report presented by statisticians and economists at the National Center for Health Statistics, U.S. Dep't of Health Education and Welfare to Expert Committee on Cancer Statistics of the World Health Organization and the International Agency for Research on Cancer at Madrid, Spain) [hereinafter cited as Rice and Hodgson]. This paper raises numerous questions about the application of cost-benefit analysis to the regulation of carcinogens, including whether the economic benefits of regulating a carcinogen include reducing the need for extra household help and special diets for patients, transportation costs for receiving medical treatment, and losses to patients that otherwise would occur in the form of reduced capital gains arising from their forced sale of assets. The report also questions whether analysis should include anxieties, personality changes, reduced sexual functions, and other social costs. Indeed, the lengthy report raises so many types of costs and benefits that it is doubtful whether any agency would have the resources to undertake the analysis.

31. STOKEY & ZECKHAUSER, *supra* note 3, at 148-49.

32. Interview with Steven Jellineck, Assistant Administrator for Toxic Substances, U.S. Environmental Protection Agency, in Washington, D.C. (Mar. 17, 1978).

estimated with confidence because no acceptable method exists to measure these attributes.³³

Furthermore, characterization of attributes may be problematic. An attribute deemed a benefit by an agency official may pose the problem of beneficiaries who do not desire the benefit or who do not even consider the attribute to be a benefit. For example, "cheap energy" is normally characterized as a benefit in a proceeding considering the construction of an energy facility. It may, however, be immaterial to those who have enough energy, or may be viewed as a cost to proponents of resource conservation.³⁴

Even if costs and benefits are identified, they may not be included in subsequent analysis for pragmatic reasons. Attributes may be too costly or too complex to measure. Exclusion may be based on a tenuous causal connection between the planned action and the possible attribute, as with the predicted probabilities of secondary or tertiary effects of a proposed agency action. Identified attributes also may be excluded for self-serving reasons. For example, if consideration of a possible disastrous consequence of a regulatory decision would tilt the outcome of the analysis against a favored agency action, it might be omitted from the final balancing process.³⁵

B. Quantifying the Value of Human Life and Other Traditionally Unquantifiable Attributes

Cost-benefit analysis works best when (1) a socially accepted method, such as market pricing, is available to measure the costs and benefits, and (2) the measurement can be expressed in dollars or some other commensurable unit. Regulatory agencies using cost-benefit analysis face a critical problem when confronted with attributes that defy traditional economic valuation.³⁶

Analysts are well aware of these problems. Some refrain from placing their own values on immeasurable attributes and redirect their

33. See SUBCOMM. ON OVERSIGHT AND INVESTIGATIONS OF THE HOUSE COMM. ON INTERSTATE AND FOREIGN COMMERCE, 94TH CONG., 2D SESS., FEDERAL REGULATIONS AND REGULATORY REFORM 515 (Comm. Print 1976), which concludes that inability to measure some attributes accurately militates against certain uses of cost-benefit analysis.

34. See further discussion of the often ambiguous character of attributes included in cost-benefit analysis in Lovins, *Cost-Risk-Benefit Assessments in Energy Policy*, 45 GEO. WASH. L. REV. 911 (1977). Lovins entertainingly describes how different values lead to different characterizations of an attribute: "Is an artful new kind of synthetic desert a benefit or a disgrace?" *Id.* at 914.

35. See Mark & Stuart-Alexander, *Disasters as a Necessary Part of Benefit-Cost Analyses*, 197 SCI. 1160 (1977).

36. The implications of DNA experimentation present a striking example of intangible decisional criteria that raise critical cost-benefit valuation problems. See generally *Recombinant DNA*, *supra* note 18.

analyses.³⁷ More typically, analysts recommend cautious use of cost-benefit analysis.³⁸ Inconclusive analyses of valuation difficulties in cost-benefit literature reflect the hope that the problem will fade or be forgotten. For instance, although Stokey and Zeckhauser maintain that the complexity and importance of measuring intangible costs and benefits should not be underestimated, they ultimately conclude that perhaps quantification should be consciously postponed.

In some cases, it may be best to avoid quantifying some intangibles as long as possible, carrying them along instead in the form of a written paragraph of description. Maybe we will find that the intangible considerations point toward the same decision as the more easily quantified attributes. Maybe one or a few of them can be adequately handled by a decision-maker without resort to quantification. We will find no escape from the numbers. . . . Ultimately the final decision will implicitly quantify a host of intangibles; there are no incommensurables when decisions are made in the real world.³⁹

This use of cost-benefit analysis is morally and intellectually irresponsible.

37. In evaluating control options for sulfur dioxide air pollution from stationary sources, Dr. Granger Morgan asserts:

There is no way that I can put a dollar value on this case. That would require me to place a dollar value on human life, and no reasonable person is prepared to do that. But I might reasonably ask how much money society is prepared to invest in order to statistically prevent one additional air pollution related death.

G. Morgan, Technical Uncertainty in the Policy-Making Process 18 (Oct. 25, 1977) (paper presented at Sixth Annual Conference of Illinois Institute for Environmental Quality).

38. The National Academy of Sciences Committee on Principles of Decision-Making for Regulating Chemicals in the Environment notes: "Different individuals place different values on things such as human life, aesthetics, or national security. Thus an analysis that assigns a quantitative value to . . . these factors is necessarily subjective and, to some degree arbitrary." CHEMICALS REPORT, *supra* note 2, at 40. The Committee notes that even where the analyst refrains from placing a dollar value on human life, a particular decision reflects an implicit valuation of life. Nevertheless, the Committee concludes that compared to other methods, cost-benefit analysis represents a significant advance and recommends its own version, called "Hazard-Cost-Benefit Comparison." *Id.* at 39-50.

39. STOKEY & ZECKHAUSER, *supra* note 3, at 153. Others have responded to the problem of valuation as an opportunity to exhibit their statistical finesse. For example, Walter Oi has undertaken to determine the price society is willing to pay for more safety.

The situation becomes a bit more complicated when the accidents involve truly nontraded goods like lives and limbs. Even here, market prices can be used to infer some implicit valuations of the contingent accident costs. Using data on wage differentials, Thaler and Rosen found that workers behaved as if they attached a value to life of \$160,000 to \$260,000. Robert S. Smith, using a slightly different body of data, came up with considerably higher implicit values of up to \$1.5 million for a life. Some variations ought to be expected because human lives are not homogenous goods like bags of No. 2 wheat.

Oi, *supra* note 23, at 19.

Oi concludes that "[s]afety and health are important economic issues," and that "[w]hether it is direct or indirect, stated or implicit, there is always a 'price' for reducing illness and accidents." *Id.* at 23. This intolerance of the experts for intangibles—for matters not expressed in dollars or other economic units of value—and this limited perspective on health, safety, and the environment pervades the cost-benefit analysis literature and has influenced agency users of cost-benefit analysis.

Today, a number of agencies assign monetary values to human life. The Nuclear Regulatory Commission (NRC) uses a value of \$1,000 per whole-body rem in its cost-benefit analysis.⁴⁰ This figure, multiplied by the number of rems capable of producing different types of deaths, provides dollar values for human life. The Environmental Protection Agency's Office of Radiation Programs establishes its environmental radiation standards at levels that will not cost more than \$500,000 for each life to be saved.⁴¹ The Consumer Product Safety Commission uses values ranging from \$200,000 to \$2,000,000 per life in its analyses.⁴²

But the fundamental issue is whether cost-benefit analysis is appropriate at all. Without an answer to this question from Congress or the courts, consideration turns to lesser issues: the proper method of valuation,⁴³ the substantive basis for valuation (possibly relying on insurance statistics, jury awards, or potential lifetime earnings), and the

40. 10 C.F.R. pt. 50 app. I (1979).

41. Interview with Dr. William Rowe, Chief Radiation Program Office, EPA, in Washington, D.C. (1977). Dr. Rowe stated that EPA would not propose a radiation standard for the uranium fuel cycle that would cost more than \$500,000 to save an additional, unspecified human life in the general population; it would save a life if the cost were less than \$100,000. For costs in between, EPA makes an ad hoc determination.

42. See B. Shimmei, Consumer Product Safety Commission: Risk Management Regulation and the Use of Cost-Benefit Analysis (May 1978) (unpublished draft for M. Baram project on Federal Regulation and Risk Management, based in part on extensive interviews with CPSC personnel). For an extensive Department of Transportation report setting values for human life, see NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION, U.S. DEP'T OF TRANSPORTATION, SOCIETAL COSTS OF MOTOR VEHICLE ACCIDENTS (Dec. 1976). This work and its periodic revisions are frequently consulted and cited with respect to monetary valuation of human life and health. The National Bureau of Standards, in its studies to find technical solutions to problems of flammable fabrics and other consumer hazards for regulatory agencies such as the Consumer Product Safety Commission (CPSC), has used a value of \$300,000 per life in arriving at its recommendations. See U.S. NATIONAL BUREAU OF STANDARDS, PRELIMINARY REPORT ON EVALUATING ALTERNATIVES FOR REDUCING UPHOLSTERED FURNITURE FIRE LOSSES 13 (Nov. 1977) (NBSIR-77-1381).

43. Consider the approach adopted by statisticians and economists at the Department of Health, Education and Welfare in their reports on the cancer data base available for use by regulatory agencies:

One, if not the chief, issue with respect to indirect costs is how to value human life. The method in this report is referred to as the "human capital" approach because it views an employed person as producing a stream of output over the years that is valued at the individual's earnings. The main criticism of this methodology is that it excludes intangibles, only counting earnings, and under-values some groups relative to others because earnings may not reflect one's ability to produce. Thus, men are more highly valued than women, whites more than blacks, and the middle-aged more than the young and elderly. . . .

An alternative approach favored by some is that of "willingness to pay." This method values human life according to the amount people are willing to spend to obtain reductions in the probability of death. Objections to this are that the value of individual lives depends on the income distribution, with the rich able to pay more than the poor, and that it is exceedingly difficult for persons to place a value on small reductions in the probability of death.

Rice & Hodgson, *supra* note 30, at 18-19.

extent agencies should articulate these issues and provide procedures for participation in the valuation process.

To date, agencies have expressed surprisingly little concern about these unresolved problems associated with cost-benefit analysis.⁴⁴ Although officials deny valuing unquantifiable factors,⁴⁵ these valuations are implicit in any cost-benefit based policy decision involving risks to human life. Responsible decisionmaking demands that implicit valuations be acknowledged and addressed explicitly.

C. *The Chronic Problem of the Discount Rate for Valuing Future Benefits and Costs in Present Analyses*

The discount rate is yet another controversial issue afflicting cost-benefit analysis. Stokey and Zeckhauser note that "no observed rate of return can provide an accurate reading of the intertemporal preferences of the society as a whole. . . . [T]he choice of a discount rate should be used deliberately to apportion costs and benefits among income groups and . . . generations, according to the values held by society."⁴⁶ Congress and the courts, however, have not decided upon a standard discount rate to establish the present value for future dollar levels of predicted attributes, such as future ecological dislocation, mutagenic effects on future generations, and other long-term consequences of actions taken by regulatory agencies.

Absent a societal decision on the appropriate discount rate, the task of establishing a present value for the future effects of agency decisions falls upon the individual analyst. This has resulted in arbitrary, inconsistent determinations in many cost-benefit analysis decisions.⁴⁷

44. For a rare exception and candid expression of concern, see W. Prunella, *A Qualitative Assessment of Cost-Benefit Analysis and its Application in the Area of Product Safety 3-4* (undated draft received Feb. 1978 from Economic Program Analysis Division, Consumer Product Safety Commission):

No accepted monetary figures for the value of life exist; nor should we expect them to exist. . . . [F]actors such as age or occupation will influence the money value placed on costs incurred. . . . [I]f children and the poor are victims, remedial action may not seem justified from the calculation of cost-benefit ratios, when at the same time, if the victims had been of a different age or income level, action would be more readily supportable.

45. Steven Jellineck, Assistant Administrator for Toxic Substances, U.S. Environmental Protection Agency, declared at a meeting of the Administrator's Advisory Committee on Toxic Substances, Nov. 1977 that his division was not going to put a dollar value on life. In light of the statutory requirements of § 6(c) of the Toxics Substances Control Act, 15 U.S.C. § 2605(c) (Supp. I 1977), however, it appears that some form of cost-benefit analysis will be adopted to regulate toxic substances. See discussion of EPA in part III of this Article.

46. STOKEY & ZECKHAUSER, *supra* note 3, at 173. See R. Campbell, *Food Safety Regulation 19* (AEI-Hoover Study 12, Aug. 1974).

47. Indeed, analysts have chosen rates that tend to confirm the outcomes they desire. Critics have attacked the use of self-serving and essentially arbitrary discount rates in the water resource projects of developer agencies such as the Corps of Engineers. The use of low discount rates, such as 2.63% in the 1950's and 1960's provided higher values for the

For instance, agency analysts have not agreed on a discount rate for the long-term carcinogenic and mutagenic effects of radioactive isotopes and toxic chemicals. Suggested rates for the future costs of cancer and other diseases range from six to ten percent, without any notable underlying rationale.⁴⁸ Analysts seem to be feeling their way toward some sign of societal acquiescence on a discount rate for long-term health and environmental attributes.⁴⁹

But focusing on the search for the societally acceptable number for discounting the future clouds the larger issue: whether using these economic principles in contemporary decisionmaking adequately ensures the desirable quality of life and health for future generations.⁵⁰ Ultimately, the discount rate issue is an ethical problem that transcends economic and legal perspectives.⁵¹

D. *Improper Distribution of Costs and Benefits*

Every regulatory decision on health, safety, or environmental problems results in costs and benefits that will be distributed in some pattern across different population sectors, and in many cases, over several generations. For example, a decision to allow the commercial distribution of a toxic substance may result in economic benefits to the industrial users, their shareholders and employees, and consumers. It may also result, however, in adverse health effects and property damage to plant employees and those living near the plant. In addition, future generations may suffer mutagenic health effects or the depletion or pollution of natural resources.

estimated future benefits of planned projects to Corps analysts, resulting in positive cost-benefit analysis ratios and favorable decisions on water resource projects. These low rates were below the yield on long-term governmental securities and Treasury issues. The debate over an appropriate discount rate for water resources projects continues today, as evidenced by President Carter's objections to proposed projects based upon a 6.38% discount rate. R. Mikesell, *The Rate of Discount for Evaluating Public Projects 3-5* (AEI Studies 184, 1977). For detailed background, see U. Kim, *A Benefit-Cost Approach to Water Resource Investments: Theory and Its Application* (unpublished paper, Dep't of Economics and Business Management, Cath. U., Washington, D.C.).

48. Rice & Hodgson, *supra* note 30, at 13.

49. For further discussion of the arbitrary choice of discount rates, see W. Prunella, *supra* note 44, at 4.

50. If the discount rate were 5 percent . . . 1 case [of poisoning by chemicals] today would be valued the same as 1730 cases occurring in 200 years, or the same as the current world population (more than 3 billion cases) in 450 years. Clearly, intergenerational effects of these magnitudes are ethically unacceptable, yet they might be made to appear acceptable if the traditional social rate of discount concept were applied. There is as yet no generally accepted method for weighting the intergenerational incidence of benefits and costs.

CHEMICALS REPORT, *supra* note 2, at 43.

51. For a brief expression of this concern by the National Academy of Sciences' Committee on the Biological Effects of Ionizing Radiations, see RADIATION REPORT, *supra* note 16, at 68-70.

Analysts and decisionmakers using cost-benefit analysis recognize these implications. Nonetheless, in the absence of public policy directives, analysts frequently apply personal assumptions about the allocation of costs and benefits while calling for objective "fairness" in dealing with distributional problems.⁵² Thus according to Stokey and Zeckhauser:

1. A program should be adopted when it will yield benefits to one group that are greater than the losses of another group, provided that the two groups are in roughly equivalent circumstances and the changes in welfare are not of great magnitude. . . .
2. If the benefits of a proposed policy are greater for one group than the costs for another group, and if it redresses the discriminatory effects of earlier policy choices, that policy should be undertaken. . . .
3. It is not so clear whether policies should be undertaken if they will benefit some groups only by imposing significant costs on others. It is sometimes proposed that a policy change should be adopted if and only if it passes a two-part test: (a) it yields positive net benefits, and (b) the redistributive effects of the change are beneficial. . . .⁵³

Such earnest analytical approaches to determining fair distributions of costs and benefits⁵⁴ ignore constitutional precepts underlying public sector decisionmaking. Constitutional guarantees of due process, equal protection, property rights, and representative government should carry greater weight in solving the distributional problem than assumptions about fairness developed by economists and analysts.

Issues of temporal distribution, involving the allocation of costs and benefits for future generations, transcend even these constitutional values. Future generations possess neither present interests nor designated representatives to advance those interests. Our laws and values favor current benefits to those that accrue later. Cost-benefit analysis also reflects a preference for current benefits over future ones.⁵⁵ Distri-

52. See Lucas, *Dividing Up the Pie*, 13 ENGINEERING: CORNELL Q. 17 (1978).

53. STOKEY & ZECKHAUSER, *supra* note 3, at 281-82. See also the assumptions in D. HARRISON, WHO PAYS FOR CLEAN AIR 127-34 (1975).

54. Cost-benefit analysis practitioners often obscure the distributional effects on specific population sectors in reaching "societally optimal" decisions. Environmental Impact Statements of NRC, for example, usually state that no undue distribution of costs and benefits will occur from a proposed power plant. But the underlying health effects analyses reveal that the most harmful exposures to ionizing radiation occur in the plant environs, whereas most of the benefits from the energy will be distributed in a broader geographic region. See Brookhaven Report, *supra* note 17, at 75-134.

55. The choice of a particular discount rate can make long-term costs and benefits virtually irrelevant to the decisionmaking process. For example, at a discount rate of 10% per year, the present value of one dollar's worth of benefit or cost received 10 years in the future is only 39 cents, received in 20 years its present value is only 15 cents, in 30 years, six cents. L. ANDERSON & R. SETTLE, BENEFIT-COST ANALYSIS: A PRACTICAL GUIDE, Table A-1 at 128 (1977).

bution over time, therefore, like the discount rate, is essentially an ethical issue for the nation. The assumptions that analysts must make about temporal distributions in using cost-benefit analysis are inadequate precisely because analysts, and not society, have made them.⁵⁶

E. Promoting Self-Interest and Other Analytical Temptations

Users of cost-benefit analysis can easily play a "numbers game" to arrive at decisions that promote or justify agency actions reached on other grounds.⁵⁷ The purportedly objective framework of cost-benefit analysis can be used to promote rather than to analyze options by manipulating the discount rate, assigning arbitrary values to identified costs and benefits, excluding costs that would tilt the outcome against the preferred option, and using self-serving assumptions about distributional fairness. Indeed, the very use of cost-benefit analysis leads some observers to conclude that the action under consideration is scheduled for approval.⁵⁸ Even self-corrective measures are suspect. For example, the use of safety factors⁵⁹ ostensibly chosen to avoid certain effects may prove to be a facile solution that does not alter the preferred analytical result if these factors are determined only *after* completing a preliminary analysis. Furthermore, these factors are usually based on

56. For further discussion, see JOINT ECONOMIC COMM., 94TH CONG., 2D SESS., FAST BREEDER REACTOR DECISION: AN ANALYSIS OF LIMITS AND THE LIMITS OF ANALYSIS 2 (Comm. Print 1976), dealing with the "heroic assumptions" that discredit cost-benefit analyses on the breeder reactor program; CHEMICALS REPORT, *supra* note 2, at 42-43; RADIATION REPORT, *supra* note 16, at 68-69, 111.

The common use of "willingness to pay" valuation to quantify benefits and costs in dollars raises an additional distributional issue. Willingness to pay, of course, is directly related to ability to pay. The interests of lower income groups therefore will be under-represented in cost-benefit analysis decisionmaking. If the underlying distribution of income is changed, willingness to pay for benefits and costs may likewise change. See L. ANDERSON & R. SETTLE, *supra* note 55, at 11-12.

57. The decision permitting regular Concorde flights into the United States provides a striking example of how the institutional bias of the analyst may determine the outcome of the balancing process, particularly when subjective and incomparable factors predominate. EPA, Council on Environmental Quality (CEQ), and Federal Energy Administration (FEA) each found the costs of expanded Concorde operations to outweigh the benefits of the proposed flights. After applying cost-benefit analysis to the same data, however, the Federal Aviation Administration, Department of State, and National Aeronautics and Space Administration concluded that Concorde flights were justified. See Note, *The Concorde Calculus*, 45 GEO. WASH. L. REV. 1037, 1061-63 (1977). See also Green, *Cost-Risk Benefit Assessment and the Law: Introduction and Perspective*, *id.* at 901.

58. Burke Zimmerman, Staff Scientist for the House Subcommittee on Health and the Environment, remembers "no instance where risk-benefit analysis resulted in the conclusion that an [agency] action should be stopped." Zimmerman, *Risk-Benefit Analysis: The Cop-Out of Governmental Regulation*, 14 TRIAL 43, 46 (1978).

59. Self-corrective measures may include allowing a wide margin of safety or delaying decisions until additional information reduces uncertainties. For a discussion of these techniques in the area of DNA research, see *Recombinant DNA*, *supra* note 18, at 66-67, 83-84.

technical estimates and do not properly consider the value-laden aspects of large, irreversible risks.

In addition, the "technology-forcing function" of regulatory programs can be stifled by limited technical and economic information. Governmental officials must often rely on the regulated industry for news of recent technological developments. Industry information is likely to be unduly pessimistic about the costs, reliability, and availability of new techniques. Thus, cost-benefit analysis based upon industrial information may become a mechanism for economically convenient regulation that tends to perpetuate the technological status quo. This result is particularly predictable when regulatory agencies have not defined their objectives. If such objectives were established initially, they would "drive" the regulatory process and more readily force development of new technology.⁶⁰

F. *Special Problems of Accountability*

The use of cost-benefit analysis raises new issues in addition to the usual problems of ensuring agency accountability to the courts, Congress, the President, and the public. Certainly the jargon, presumably objective numbers, and analytical complexities of cost-benefit analysis obscure the subjective assumptions, uncertain data, and arbitrary distributions and valuations of the decisionmaking process, thereby preventing meaningful review of agency activity. Agency uses of cost-benefit analysis tend to promote the role of experts and diminish the participatory and review roles of nonexperts.⁶¹

Senator Muskie has voiced his concern about agencies including "questionable benefits" that can make projects appear "economically

60. See RADIATION REPORT, *supra* note 16, at 109-11; [1975] 6 ENVIR. REP. (BNA)—MONOGRAPHS No. 21.

61. See Senator Muskie's letter requesting that "the general methodology of the benefit-cost ratio analysis as carried out by the Corps of Engineers . . . be investigated," and that "the use of probability analysis in the calculation of benefits for water resources projects . . . be reviewed." Muskie letter to GAO, *supra* note 3, at 19. The subsequent report of the General Accounting Office calling for reforms in the Corps' presentation of alternatives is not responsive to the Muskie request. See U.S. GENERAL ACCOUNTING OFFICE, IMPROVED FORMULATION AND PRESENTATION OF WATER RESOURCES PROJECT ALTERNATIVES PROVIDE A BASIS FOR BETTER MANAGEMENT DECISIONS (Feb. 1, 1978). See also numerous NRC Regulatory Guides and Environmental Impact Analyses. For example, NRC's Environmental Statement on the Tyrone Energy Park (Apr. 1977) (NUREG-0226) contains extensive cross-references to technical analyses, reports, and other background cost-benefit analyses and information adopted by NRC. One of the critical issues, however, is dealt with by a simple concluding sentence disconnected from the foregoing analysis: "The staff concludes that the distribution of costs and benefits does not place unreasonable costs on any segment of the population." *Id.* at 10-24. The cost-benefit approaches of NRC and the National Bureau of Standards are examples of complex regulatory decision records that are virtually incomprehensible and unreviewable except by highly persistent and technically sophisticated individuals.

sound.”⁶² He has called for evaluating projects at different stages of completion “to find if the validity of benefits claimed at project authorization can be reaffirmed during and after construction.”⁶³ No governmental agency has adopted this approach despite its obvious value in improving subsequent uses of cost-benefit analysis.

In its cost-benefit analysis of nuclear reactor licensing decisions, NRC estimates the population that will live near the reactor site in the future. Yet neither NRC nor any other governmental body attempts to control actual population growth in the areas surrounding nuclear plants. Thus the estimated cost-benefit basis for approving a proposed activity is not used as a planning tool for maintaining predicted costs and benefits once the activity is undertaken. The actual costs and benefits consequently may vary considerably from those projected in the analysis.⁶⁴

Additionally, the combination of fragmented regulatory jurisdiction over pervasive problems and increased agency reliance on cost-benefit analysis ultimately leads to increased societal risk. For example, a trace metal such as mercury constitutes a health and environmental quality hazard. It is regulated by several agencies, including the Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), Consumer Product Safety Commission (CPSC), and Food and Drug Administration (FDA). Each agency may permit some activity introducing an additional incremental amount of the pollutant into the environment because the minor amount of calculable human exposure or environmental harm in each instance is offset by a broad range of postulated societal benefits. Even though each agency may be making careful and objective decisions, without overall interagency accounting for the increasing risk to the general population and the environment from these many small decisions, the total societal risk will continue to aggregate.⁶⁵

The above taxonomy of methodological problems reveals the need for a “best efforts” approach, fostered by Congress and the President, and administered by the agencies and the courts, to exclude the use of cost-benefit analysis under certain conditions and to resolve rational and humanistic concerns. This best efforts approach should focus on: (1) improving the technical and objective quality of cost-benefit analysis; (2) establishing the limits and societal implications of cost-benefit

62. Muskie letter to GAO, *supra* note 3, at 19.

63. *Id.*

64. Baram, *An Assessment of the Use of Cost-Benefit Analysis in Regulatory Agency Decision Making* in RETROSPECTIVE TECHNOLOGY ASSESSMENT—1976, at 20 (J. Tarr ed. 1977). This article is based in part on an analysis of various NRC enforcement deficiencies and practical problems discussed in RADIATION REPORT, *supra* note 16.

65. See Baram, *Regulation of Environmental Carcinogens: Why Cost-Benefit Analysis May Be Harmful to Your Health*, 78 TECH. REV. 41 (1976).

analysis; (3) improving public participation; and (4) designing more effective measures for congressional and executive oversight of agency practices.

III

AGENCY USES OF COST-BENEFIT ANALYSIS UNDER STATUTORY MANDATE

Congress and the Office of the President have fostered the use of cost-benefit analysis in regulatory decisionmaking through statutes⁶⁶ and Executive orders⁶⁷ that either expressly require it or call for balancing of competing considerations. This section reviews these mandates and agency experience with cost-benefit analysis. NEPA is discussed initially because it is a general source of authority for all federal agencies to perform balancing analyses, and because it has generated extensive litigation on the cost-benefit issue.

Although Congress frequently requires regulatory agencies to balance multiple societal objectives in their decisionmaking, it has not provided guidance for structuring agency discretion on these substantive matters. At the most basic level, Congress should address the relative importance of factors in the balancing process, including the classic problems of valuation, discount rates, distribution of costs and benefits, and the analytical framework to be used in reaching decisions. By failing to provide this legislative guidance, Congress has exposed the agencies to unnecessary litigation.⁶⁸

66. The Congressional Office of Technology Assessment has determined that cost-benefit analysis is required or permitted in agency decisionmaking under many of the regulatory provisions of the following statutes: Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C.A. §§ 135-136y (West 1964 & Supp. 1979); Federal Hazardous Substances Act, 15 U.S.C.A. §§ 1261-1275 (West 1974 & Supp. 1979); Consumer Product Safety Act, 15 U.S.C.A. §§ 2051-2082 (West 1974 & Supp. 1979); Toxic Substances Control Act, 15 U.S.C. §§ 2601-2629 (1976 & Supp. I 1977); Federal Food, Drug, and Cosmetic Act, 21 U.S.C.A. §§ 301-392 (West 1972 & Supp. 1979); Occupational Safety and Health Act of 1970, 29 U.S.C.A. §§ 651-678 (West 1975 & Supp. 1979); Clean Water Act, 33 U.S.C.A. §§ 1251-1376 (West 1978 & Supp. 1979); Clean Air Act, 42 U.S.C.A. §§ 7401-7642 (West Supp. 1978). See Office of Technology Assessment, U.S. Congress, *Cancer Testing Technology and Saccharin* 16 (Oct. 1977).

67. See note 21 *supra*.

68. For example, the court in *Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375 (D.C. Cir. 1973), *cert. denied*, 417 U.S. 921 (1974), ruling on the scope of balancing required by § 111 of the Clean Air Act, held that EPA need not carry out a quantified cost-benefit analysis in support of its performance standards for new sources. In *Union Electric v. EPA*, 427 U.S. 246 (1976), the Supreme Court interpreted § 110(a)(2) of the Act as barring the consideration of economic and technological infeasibility when the EPA Administrator reviews and approves a State Implementation Plan.

A. The National Environmental Policy Act and Cost-Benefit Analysis

The National Environmental Policy Act of 1969 (NEPA)⁶⁹ requires federal agencies to consider environmental quality as an integral part of their decisionmaking. The "action-forcing" requirement of section 102(2)(C) provides that each agency must prepare an environmental impact statement (EIS) for all "major Federal actions significantly affecting the quality of the human environment."⁷⁰ The EIS must provide a detailed account of the expected beneficial and adverse impacts of the proposed action on the environment and evaluate possible alternatives to the action.

Sections 102(2)(A) and (B) also play a major role in the development of cost-benefit analysis under NEPA, although unlike section 102(2)(C), they contain no enforceable mandate. These two provisions require all federal agencies to:

- (A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking which may have an impact on man's environment;
- (B) identify and develop methods and procedures, in consultation with the Council on Environmental Quality, . . . which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations.⁷¹

In *Calvert Cliffs' Coordinating Committee v. AEC*⁷² the District of Columbia Circuit construed these provisions to require balancing of environmental benefits in relation to economic and technical factors. Interpreting NEPA's requirement that these factors be weighed in a "detailed statement,"⁷³ the court stated: "NEPA mandates a case-by-case balancing judgment on the part of the federal agencies. In each individual case, the particular economic and technical benefits of planned action must be assessed and then weighed against the environmental costs; alternatives must be considered which would affect the balance of values."⁷⁴

The court did not, however, prescribe any particular methodology, such as fully quantified cost-benefit analysis, for carrying out this balancing analysis. Later opinions concerning EIS's prepared pursuant to NEPA have adhered to the balancing requirement without insisting on quantification or monetization of environmental values.⁷⁵

69. 42 U.S.C.A. §§ 4321-4369 (West 1977 & Supp. 1979).

70. NEPA § 102(2)(C), 42 U.S.C. § 4332(2)(C) (1976).

71. *Id.* § 102(2)(A), (B), 42 U.S.C. § 4332(2)(A), (B).

72. 449 F.2d 1109 (D.C. Cir. 1971).

73. NEPA § 102(2)(C), 42 U.S.C. § 4332(2)(C) (1976).

74. 449 F.2d at 1123.

75. See Leventhal, *supra* note 10, at 529.

The Council on Environmental Quality (CEQ), established to assist in the implementation of NEPA,⁷⁶ has failed to provide useful guidance on the balancing requirement. An Executive order⁷⁷ authorized CEQ to issue regulations, rather than mere guidelines, concerning preparation of EIS's and the resolution of interagency conflicts, but CEQ has not used these extended powers to guide the development of cost-benefit analysis methodology under NEPA. Further, CEQ's final regulations for NEPA, promulgated in response to Executive Order 12044,⁷⁸ fail to set guidelines on critical methodological issues.⁷⁹

Meaningful CEQ guidelines would provide agencies with a more rational, consistent framework for addressing methodological problems posed by NEPA. But CEQ alone cannot resolve these thorny questions. Congress eventually must address problems of "valuing" intangibles such as human health and environmental amenities. Moreover, Congress could improve the NEPA balancing process by defining the weight to be afforded EIS results. Congress, for example, could amend NEPA to confirm NRC's interpretation that an agency may select any alternative with a positive EIS cost-benefit ratio unless an "obviously superior" alternative exists,⁸⁰ or Congress could require

76. Council on Environmental Quality Act, Pub. L. No. 91-190, 83 Stat. 854 (codified at 42 U.S.C. § 4342 (1976)).

77. Exec. Order No. 11,991, 42 Fed. Reg. 26,967 (1977).

78. See text accompanying notes 172-79 *infra*.

79. See 40 C.F.R. § 1502.23 (1979).

If a cost-benefit analysis relevant to the choice among environmentally different alternatives is being considered for the proposed action, it shall be incorporated by reference or appended to the statement as an aid in evaluating the environmental consequences. To assess the adequacy of compliance with sec. 102(2)(B) of the Act the statement shall, when a cost-benefit analysis is prepared, discuss the relationship between that analysis and any analyses of unquantified environmental impacts, values, and amenities. For purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations. In any event, an environmental impact statement should at least indicate those considerations, including factors not related to environmental quality, which are likely to be relevant and important to a decision.

Id.

80. After completion of cost-benefit analysis in evaluating power plant sites, a further issue inevitably arises: whether NRC should select the proposed site if it is reasonably acceptable or only if it is the best site. NRC, under its own regulations requiring cost-benefit analysis under NEPA, has determined that the best site need not be chosen, but that the proposed site can be chosen if the results of the cost-benefit analysis are favorable and no "obviously superior site" is an alternative. Brookhaven Report, *supra* note 17, at 105-06.

In its decision on Seabrook Station, the Commission determined that:

[I]t would be unreasonable to say that environmental advantages automatically take precedence.

. . . [A]s the *Calvert Cliffs* decision noted, "Congress did not establish environmental protection as an exclusive goal."

. . . Two significant realities of the NEPA process support the use of the standard of obvious superiority—the inherent imprecision of cost/benefit analysis and the probability that more adverse information has been developed respecting the closely examined proposed site than any alternatives. The imprecision springs

selection of the most favorable alternative. Absent clarification from Congress, CEQ, or the courts, agencies conducting a balancing analysis under NEPA retain considerable discretion on methodological and related procedural issues.

Lack of Congressional guidance also allows agencies to make the initial decision about which actions are subject to the EIS requirement. Although NEPA expressly provides for environmental impact assessment of "major federal actions,"⁸¹ it does not distinguish between rulemaking, licensing, and other federal agency actions. Agencies take sharply different positions on the applicability of NEPA's balancing requirements to rulemaking. For example, NRC construes NEPA, together with its own enabling legislation, to authorize a quantified cost-benefit analysis as part of its environmental impact assessment in its rulemaking.⁸² On the other hand, EPA does not consider its rulemaking legally subject to NEPA and prepares only a limited number of EIS's on rulemaking actions.⁸³ Between these two extremes stand agencies such as OSHA, which recognize the applicability of NEPA to its promulgation of health and safety standards,⁸⁴ but provides that a qualitative balancing of costs and benefits is sufficient for such actions.⁸⁵

As a result of these uncertainties under NEPA, much of the economic analysis of rulemaking actions is made under the Executive orders discussed in Part IV. These analyses, however, need not meet the

from the nature of cost/benefit analysis . . . the factors to be compared range from broad concerns of system planning, safety, engineering, economic and institutional factors to environmental concerns, including ecological, biological, aesthetic, sociological, recreational, and so forth. Much of the underlying cost-benefit data is difficult of articulation, much less quantification. Given these difficulties, any evaluation of a particular site must inevitably have a wide margin of uncertainty. . . . [W]here the data to be compared necessarily present a wide margin of uncertainty, one site must appear to be substantially "better."

In re Public Service Co., 5 NRC 527-28 (1977).

Recognizing the limitations inherent in its use of cost-benefit analysis, NRC has established that cost-benefit analysis provides a rough method for attempting to structure as rational a decision process as possible.

81. NEPA § 102(2)(C), 42 U.S.C. § 4332(2)(C) (1976).

82. See note 126 *infra* and accompanying text.

83. Based on its mandate to protect the environment and specific exemptions in its enabling statutes, EPA claims to be exempt from the EIS requirements of NEPA in many of its rulemaking activities. See [1979] 10 ENVIR. REP. (BNA) — MONOGRAPHS No. 28, at 44. EPA announced that it was not required by law to prepare EIS's for any of its regulatory actions. 39 Fed. Reg. 16,186 (1974). The agency did, however, voluntarily agree to carry out environmental impact analyses in connection with some of its major regulatory decisions on air pollution, noise, radiation, ocean pollution, and pesticide control. 39 Fed. Reg. 37,419 (1974). The District Court rejected a similar NEPA exemption claim made by the Food and Drug Administration in *EDF v. Mathews*, 410 F. Supp. 336 (D.D.C. 1976).

84. 29 C.F.R. § 1999.2(a) (1979).

85. *Id.* § 1999.4(b). *But cf.* *American Petroleum Institute v. OSHA*, 581 F.2d 493 (5th Cir. 1978), *cert. granted sub nom. Marshall v. American Petroleum Institute*, 440 U.S. 906 (1979) (OSHA's benzene standard set aside because no *factual* basis for estimating benefits).

public participation and judicial review requirements for cost-benefit analyses prepared under NEPA.

B. *Enabling Statutes and Cost-Benefit Analysis*

1. *Environmental Protection Agency*

Statutory vagueness has caused considerable uncertainty as to whether EPA must perform cost-benefit analysis or any other form of balancing when regulating air, water, and radiation. Ordinarily, this uncertainty is resolved under particular statutory provisions only after EPA has acted, when regulated industries bring lawsuits contending that the agency should have relied on a more formal cost-benefit analysis approach. In such cases, earlier clarification of congressional intent would improve EPA's ability to meet its statutory obligations within mandated time periods.

The Clean Air Act,⁸⁶ for example, precludes consideration of economic cost in setting standards for hazardous air pollutants,⁸⁷ regulating most fuel additives,⁸⁸ and establishing national primary and secondary ambient air standards.⁸⁹ In other areas of decisionmaking, however, the statute allows consideration of economic costs.⁹⁰

Authority to use cost-benefit analysis in regulating pesticides is more clearly defined. The Federal Environmental Pesticide Control Act of 1972⁹¹ requires the registration of pesticides.⁹² Before approving a registration request, EPA must determine that the pesticide "will perform its intended function without unreasonable adverse effects on the environment."⁹³ These are cost-benefit based determinations because "unreasonable adverse effects on the environment" is defined as "any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide."⁹⁴

The Toxic Substances Control Act⁹⁵ permits EPA to take a balancing approach to the regulation of toxic chemical substances and mixtures by authorizing regulation when there is a reasonable basis to

86. 42 U.S.C.A. §§ 7401-7642 (West Supp. 1979).

87. See Clean Air Act § 112(b)(1)(B), 42 U.S.C. § 7412(b)(1)(B) (Supp. I 1977).

88. *Id.* § 211(c)(1)(A), 42 U.S.C. § 7545(c)(1)(A).

89. *Id.* § 109(b)(1), (2), 42 U.S.C. § 7409(b)(1), (2).

90. *Id.* § 317, 42 U.S.C. § 7617. The bases for decisionmaking, however, are not altered by consideration of economic costs. See note 68 *supra*.

91. 7 U.S.C. §§ 136-136y (1976).

92. *Id.* § 3, 7 U.S.C. § 136(a).

93. *Id.* § 3(c)(5)(C), 7 U.S.C. § 136a(c)(5)(C).

94. *Id.* § 2(bb), 7 U.S.C. § 136(bb). EPA's implementing regulations, 40 C.F.R. § 162.11 (1979), define the "costs" associated with a pesticide largely in terms of its toxicity.

41 Fed. Reg. 21,402 (1976) provides additional methodological guidance.

95. 15 U.S.C.A. §§ 2601-2629 (West Supp. 1979).

conclude that unregulated manufacturing, distribution, or other activity involving a chemical may "present an unreasonable risk of injury to health or the environment."⁹⁶ In promulgating a rule under this section, EPA must develop findings on four factors:

- (A) the effects of such substance or mixture on health and the magnitude of the exposure of human beings to such substance or mixture,
- (B) the effects of such substance or mixture on the environment and the magnitude of the exposure of the environment to such substance or mixture,
- (C) the benefits of such substance or mixture for various uses and the availability of substitutes for such uses, and
- (D) the reasonably ascertainable economic consequences of the rule, after consideration of the effect on the national economy, small business, technological innovation, the environment, and public health.⁹⁷

Based on this analysis of costs and benefits, EPA must adopt the "least burdensome" requirements necessary to protect against the risk of injury from the regulated substance.⁹⁸

Under the Noise Control Act of 1972,⁹⁹ EPA may establish noise emission standards "requisite to protect the public health and welfare"¹⁰⁰ from major sources of noise for which such standards are "feasible."¹⁰¹ The standard itself is to be based on best available technology, but additional factors may be considered, including the cost of compliance and the extent and conditions of the product's use.¹⁰²

EPA possesses broad authority to deal with water pollution under the Clean Water Act.¹⁰³ Sections of the Act establishing the construction grants program for publicly owned waste treatment works mandate the use of cost-effectiveness analysis.¹⁰⁴ Judicial decisions interpreting section 1314(b)(1) uniformly have rejected industry contentions that EPA must justify the "best practicable technology" (BPT) effluent limitations with a mathematically exact cost-benefit analysis.¹⁰⁵

96. 15 U.S.C. § 2605(a) (Supp. I 1977). For a general discussion of environmental risks presented by toxic chemicals, see Page, *A Generic View of Toxic Chemicals and Similar Risks*, 7 *ECOLOGICAL L.Q.* 207 (1978).

97. 15 U.S.C. § 2605(c)(1) (Supp. I 1977).

98. *Id.* § 2605(a).

99. 42 U.S.C.A. §§ 4901-4918 (West 1977 & Supp. 1979).

100. Noise Control Act § 6(c)(1), 42 U.S.C. § 4905(c)(1) (Supp. I 1977).

101. *Id.* § 6(a)(1)(A), (B), 42 U.S.C. § 4905(a)(1)(A), (B) (1976).

102. *Id.* § 6(c)(1), 42 U.S.C. § 4905(c)(1) (Supp. I 1977).

103. 33 U.S.C. §§ 1251-1376 (1976 & Supp. I 1977).

104. Clean Water Act § 201(g)(5), 33 U.S.C. § 1281(g)(5) (Supp. I 1977).

105. See *E.I. duPont de Nemours & Co. v. Train*, 541 F.2d 1018, 1030 (4th Cir. 1976), modified on other grounds, 430 U.S. 112 (1977); *American Petroleum Institute v. EPA*, 540 F.2d 1023, 1037-38 (10th Cir. 1976). See also Kalur, *Will Judicial Error Allow Industrial Point Sources to Avoid BPT and Perhaps BAT Later: A Story of Good Intentions, Bad Dictum, and Ugly Consequence*, 7 *ECOLOGICAL L.Q.* 955 (1979).

Courts instead have found that EPA's use of cost-effectiveness analysis to determine best practicable technology satisfied the statute; EPA need not quantify benefits in monetary terms.

Similar controversy has arisen over EPA's authority to control effluent discharges by 1983 through the so-called best available technology (BAT) standards. In setting BAT standards, EPA is required to consider the cost of achieving the desired effluent reduction, but it is not required to balance costs against benefits as it is under the BPT provision. By expressly requiring cost-benefit analysis under BPT but not under BAT,¹⁰⁶ it appears that Congress intended to tolerate a greater disparity between costs and apparent benefits under the BAT standards than under the BPT standards.

In *American Iron & Steel Institute v. EPA*,¹⁰⁷ the Third Circuit approved this interpretation of the BAT standards, noting that costs need not explicitly be compared to benefits and that the Administrator may exercise considerable discretion in weighing costs for purposes of defining BAT, provided that his decisions are reasonable.¹⁰⁸ The Fourth Circuit adopted a significantly different view of the BAT requirements in *Appalachian Power Co. v. Train*,¹⁰⁹ setting aside EPA's thermal backfit regulations for steam electric power plants. The court concluded that the BAT provisions require EPA to compare the benefits of thermal effluent limitation with costs for alternative levels of heat reduction in order to justify standards based on best available technology economically achievable.¹¹⁰ To date, however, no other circuit has followed *Appalachian Power*. Moreover, the balancing analysis mandated by *Appalachian Power* does not require any radical shift in EPA's analytical technique. The court recognized that a quantified analysis of costs and benefits would be unworkable.¹¹¹ Accordingly, on remand, EPA was required only to *state* the benefits, especially those to aquatic life, associated with the various alternatives to be considered.¹¹² Wherever benefits cannot be stated, the court ruled that EPA must support that assertion with a scientific opinion.¹¹³

EPA is also subject to NEPA's general mandate that agencies con-

106. Clean Water Act § 304(b)(1)(B), 33 U.S.C. § 1314(b)(1)(B) (1976), states that the factors to be used in evaluation of the BPT "shall include consideration of the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application." In contrast, assessment of factors in determining the BAT "shall take into account . . . the cost of achieving such effluent reduction." *Id.* § 304(b)(2)(B), 33 U.S.C. § 1314(b)(2)(B).

107. 526 F.2d 1027 (3d Cir. 1975).

108. *Id.* at 1051-52.

109. 545 F.2d 1351 (4th Cir. 1976).

110. *Id.* at 1361.

111. *Id.*

112. *Id.* at 1365.

113. *Id.* at 1364.

sider the environmental impact of proposed major actions and evaluate alternatives to such actions. In one of its rare applications of NEPA's EIS provisions, EPA prepared a "voluntary" EIS in connection with its radiation standard for the uranium fuel cycle.¹¹⁴ This document illustrates in detail EPA's application of cost-benefit techniques to the regulation of environmental radiation. Congressional silence about the applicability of NEPA to EPA regulatory activities, coupled with EPA's failure to establish a standard policy concerning its use of quantified balancing analyses, has led to varied cost-benefit analysis approaches to its rulemaking—some required by statute, others voluntarily undertaken, and all without meaningful congressional or agency guidance on critical methodological issues.¹¹⁵ This brief review of EPA authority to use cost-benefit analysis in its regulatory decision-making process demonstrates the substantial confusion resulting from various statutory mandates.

2. Nuclear Regulatory Commission

The major statutory sources of NRC authority, The Atomic Energy Act of 1954¹¹⁶ and the Energy Reorganization Act of 1974,¹¹⁷ do not expressly require NRC to use cost-benefit analysis in setting standards for nuclear power activities or licensing reactors. Nevertheless, NRC extensively uses cost-benefit analysis in its rulemaking, licensing, and other nuclear power plant control activities. This raises two unresolved questions: (1) whether NRC has statutory authority and discretion to balance competing considerations in establishing standards for radiation emission controls; and (2) whether NRC should use cost-effectiveness analysis instead of cost-benefit analysis.

The NRC's predecessor, the Atomic Energy Commission (AEC), used cost-benefit analysis in setting standards and issuing licenses under the implied authority of the 1954 Act and the recommendations of expert advisory groups. The purpose of the 1954 Act was to foster research and development of atomic energy to promote national security and industrial progress, subject to appropriate safeguards to protect public health and safety.¹¹⁸ Given these multiple objectives, AEC

114. See OFFICE OF RADIATION PROGRAMS, U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL RADIATION PROTECTION REQUIREMENTS FOR NORMAL OPERATIONS OF ACTIVITIES IN THE URANIUM FUEL CYCLE, FINAL ENVIRONMENTAL IMPACT STATEMENT (Nov. 1, 1976) (EPA Rep. No. 520/4-76-016).

115. See text accompanying notes 232-37 *infra* for further discussion of EPA's use of cost-benefit analysis.

116. Ch. 1073, 68 Stat. 919 (1954) (current version at 42 U.S.C.A. §§ 2011-2296 (West 1973 & Supp. 1979)).

117. 42 U.S.C.A. §§ 5801-5891 (West 1977 & Supp. 1979).

118. See ch. 1073, § 3, 68 Stat. 922 (1954) (current version at 42 U.S.C. § 2013 (1976)).

could imply a duty to balance developmental interests against health and safety in making decisions.

The AEC adopted the recommendations of several independent advisory groups that cost-benefit methods be employed for setting standards to control exposure to ionizing radiation. The Federal Radiation Council¹¹⁹ recommended that licensees reduce exposures and releases of radioactive materials "as low as is reasonably achievable," taking into account "the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations."¹²⁰ The AEC adopted this recommendation.¹²¹

In *Crowther v. Seaborg*,¹²² a federal court considered the validity of AEC radiation standards and reviewed its standard-setting process, which "requires the weighing of . . . risks and benefits."¹²³ The court noted:

[W]eighing requires a value judgment as well as a measuring, and thus the standards are not scientific numbers below which no danger exists. The value judgment embodies complex social and political considerations, for atomic energy has a potential that suggests unlimited benefits to entire nations and presents a risk to entire populations . . . and perhaps their progeny.¹²⁴

The court upheld the AEC standards and standard-setting practices, relying on the "strong presumption of the validity and regularity of the standards when administrative officials decide weighty issues within the specific area of their authority and the burden is on the plaintiffs to overcome this presumption."¹²⁵

119. The Federal Radiation Council, a presidential advisory group, was terminated in 1970 and its functions transferred to EPA. Reorg. Plan No. 3 of 1970, 3 C.F.R. 1075 (1966-1970 Compilation), reprinted in 5 U.S.C. app., at 828 (1976) and in 84 Stat. 2088 (1970-1971).

120. 10 C.F.R. § 20.1(c) (1979).

121. *Id.*

122. 312 F. Supp. 1205 (D. Colo. 1970).

123. *Id.* at 1231.

124. *Id.*

125. *Id.* at 1234. Following this judicial affirmation of AEC practices, the National Academy of Sciences' Committee on the Biological Effects of Ionizing Radiations (the BEIR Committee), offered several recommendations for the control of ionizing radiation, including that "[n]o exposure to ionizing radiation should be permitted without the expectation of a commensurate benefit." NATIONAL ACADEMY OF SCIENCES, THE EFFECTS ON POPULATIONS OF EXPOSURE TO LOW LEVELS OF IONIZING RADIATION 2 (1972).

In 1973, the International Commission of Radiological Protection (ICRP) similarly recommended that regulation of doses of radiation be "low enough to satisfy both of two inter-related conditions: (a) the doses should be as low as is reasonably achievable, economic and social considerations being taken into account; and (b) the doses should be justifiable by the expected benefits of the procedures." International Commission on Radiological Protection, Pub. No. 22, Implications of Commission Recommendations that Doses Be Kept as Low as Readily Achievable 5 (1973). The ICRP recommendations of 1973 further provided that "[t]he acceptability of levels of exposure to radiation for a given activity should be determined by a process of cost-benefit analysis."

In the early 1970's, the AEC initiated proceedings to enhance the use of cost-benefit analysis in its radiation programs. These proceedings, incomplete at the time of AEC's abolition and creation of the NRC in 1974, were completed by the NRC in 1974 and resulted in the adoption of Appendix I. Appendix I, included in NRC regulations,¹²⁶ remains the fundamental source on analytical approaches for NRC rulemaking and other regulatory activities applicable to radiation. There has not been any apparent NRC modification of this analytical approach despite passage of the Energy Reorganization Act of 1974.¹²⁷

It can be argued that the 1974 Act, which transferred many of AEC's functions to NRC, simply did not allow NRC to continue AEC's brand of decisionmaking as affirmed in *Crowther v. Seaborg* in 1970.¹²⁸ Moreover, the 1974 Act arguably impaired the ability of NRC to use cost-benefit analysis in its health and safety regulatory practices. Because the new Energy Research and Development Administration (ERDA) fosters developmental activities, while NRC pursues the single objective of ensuring public health and safety, NRC should not use cost-benefit analyses to ensure development of nuclear power. Arguably, under the 1954 and 1974 Acts, NRC lacks clear statutory authority to develop standards through cost-benefit based regulation. Furthermore, the EPA's off-site maximum exposure standards for radiation¹²⁹ "regulate the NRC" by providing the ultimate limitations on nuclear power. It follows that the NRC role in setting ionizing radiation emission and other standards is restricted to ensuring that the radiation emanating from any plant does not surpass the EPA limits. If this interpretation is correct, the NRC's use of cost-benefit analysis and its valuation of broad societal and economic factors in establishing standards is unwarranted. Under these EPA limits, however, NRC could use a cost-effectiveness approach to source regulation. This would be consistent with the requirements of NEPA¹³⁰ and various Executive orders.¹³¹

NRC also employs a balancing analysis in its review of nuclear power plant construction and operating permit applications. The balancing analysis required by NEPA¹³² has been shaped by subsequent

126. 10 C.F.R. pt. 50 app. I (1979).

127. 42 U.S.C.A. §§ 5801-5891 (West 1977 & Supp. 1979). The Act abolished AEC and generally transferred its functions to ERDA. 42 U.S.C. § 5814 (a), (c) (1976). One exception to this general authorization was the transfer to NRC of the licensing and related regulatory functions of AEC. *Id.* § 5841(f).

128. 312 F. Supp. 1205 (D. Colo. 1970). See text accompanying notes 122-25 *supra*.

129. 10 C.F.R. pt. 50 app. I (1979).

130. See text accompanying notes 69-85 *supra*.

131. See note 21 *supra*. See also text accompanying notes 136-206 *infra*.

132. NEPA § 102(2)(A), (B), 42 U.S.C. § 4332(2)(A)(B) (1976). See text accompanying notes 69-71 *supra*.

judicial¹³³ and NRC determinations,¹³⁴ and various economic, social, environmental and institutional constraints.¹³⁵ NEPA requirements for considering the economic and technical implications as well as the environmental effects of major federal actions can be construed as authorizing NRC use of cost-benefit analysis in the licensing of reactors. However, NRC recognizes that such reviews essentially are now cost-effectiveness analyses, given that all these constraints must be built into their analyses.

IV

COST-BENEFIT ANALYSIS UNDER EXECUTIVE ORDERS

Several Executive orders requiring economic analysis in agency rulemaking have promoted agency use of cost-benefit analysis. Under these orders, the President's Office of Management and Budget (OMB), Council of Economic Advisors (CEA), Council on Wage and Price Stability (COWPS), Office of Science and Technology Policy (OSTP), and several Presidential aides play increasingly significant and controversial roles in forcing regulatory agencies to use cost-benefit analysis to solve health, safety, and environmental problems. Thus regulatory agencies carrying out their congressional mandates must justify proposed rules on health, safety, and environmental protection by demonstrating to the President that the expected benefits will exceed the expected costs.

A. Ford Administration "Inflationary Impact" Executive Orders

President Ford's Executive Order 11821,¹³⁶ amended by Executive

133. *Calvert Cliffs' Coordinating Comm. v. AEC*, 449 F.2d 1109 (D.C. Cir. 1971). See text accompanying notes 72-75 *supra*.

134. 10 C.F.R. § 51 (1979). See also U.S. Nuclear Regulatory Commission, Preparation of Environmental Reports for Nuclear Power Stations, Regulatory Guide 4.2, Revision 2, NUREG-0099 (July 1976).

135. U.S. Nuclear Regulatory Commission, Preparation of Environmental Reports for Nuclear Power Stations, Regulatory Guide 4.2, Revision 2, NUREG-0099, at viii (July 1976). Many federal health, safety, and environmental regulatory agencies other than EPA and NRC use cost-benefit analysis in their decisionmaking process. Thus, the problems of a proper discount rate, valuation of human life and other unquantifiable factors, arbitrary manipulation of variables, and the distribution of costs and benefits across populations and over generations also affect the quality of regulatory action taken by such agencies as the Food and Drug Administration, Consumer Product Safety Commission, Army Corps of Engineers, Bureau of Reclamation, Federal Aviation Administration, and the Occupational Safety and Health Administration. For a thorough review of these agencies' experience with cost-benefit analysis and the methodological limitations of the analytical technique, see M. Baram, Regulation of Health, Safety and Environmental Quality and the Use of Cost-Benefit Analysis, (Mar. 1, 1979) (final report to the Administrative Conference of the United States).

136. 3 C.F.R. 926 (1971-1975 Compilation).

Order 11949,¹³⁷ directed federal regulatory agencies to consider the inflationary impact of "all major legislative proposals, regulations, and rules emanating from the executive branch of the Government."¹³⁸ OMB, which held general oversight responsibility for the Inflationary Impact Statement (IIS) programs,¹³⁹ guided the agencies in developing criteria for identifying "major" actions and developing procedures for evaluating inflationary impact.

The OMB guidelines recommending that agencies use cost-benefit analysis to determine inflationary impact¹⁴⁰ appear to have had limited effect on agency decisions.¹⁴¹ Since agencies had to prepare impact statements only for "major" rulemaking proposals, individual regulations frequently fell beyond the reach of the IIS.¹⁴² As a result, logically unified programs like the Standards Completion Project of the Occupational Safety and Health Administration (OSHA), involving over 300 individual regulations governing worker exposure to chemi-

137. 3 C.F.R. 161 (1977 Compilation).

138. 3 C.F.R. 926 (1971-1975 Compilation).

139. Executive Order 11949, 3 C.F.R. 161 (1977 Compilation), amended the term "inflationary impact statement" to "economic impact statement." In this Article, however, the earlier term is used and abbreviated as IIS, in order to avoid confusion with the term "environmental impact statement" (EIS), which occurs throughout the Article.

140. Office of Management and Budget, U.S. Executive Office of the President, Circular No. A-107 *re* Evaluation of the Inflationary Impact of Major Proposals for Legislation and for the Promulgation of Regulations of Rules (Jan. 28, 1975). Such evaluations include, where applicable:

- (1) an analysis of the principal cost or other inflationary effects of the action on markets, consumers, businesses, etc., and, where practical, an analysis of secondary cost and price effects. These analyses should have as much quantitative precision as necessary and should focus on a time period sufficient to determine economic and inflationary impacts.
- (2) a comparison of the benefits to be derived from the proposed action with the estimated costs and inflationary impacts. These benefits should be quantified to the extent practical.
- (3) a review of alternatives to the proposed action that were considered, their probable costs, benefits, risks, and inflationary impacts compared with those of the proposed action.

Id. at 2.

141. This judgment was reached after numerous personal discussions with personnel in OMB and several agencies in Washington, D.C. (1978).

142. Early review of the IIS program revealed inadequacies in agency procedures for identifying major and minor regulatory actions. OMB proposed a measure to tighten up the identification process:

1. Agencies must state in the Federal Register at the time of publication that minor rules and regulations (that is, those whose impacts do not exceed the IIS criteria) have been reviewed and do not require an IIS. A similar statement should be made in correspondence to OMB for legislative proposals deemed to be minor.
2. Upon request from the Council on Wage and Price Stability (COWPS), an agency must provide a brief description of its reasons for concluding that a proposed action is minor.

Office of Management and Budget, U.S. Executive Office of the President, Memorandum *re* Changing IIS Requirements (June 11, 1976).

cal, escaped cost-benefit analysis.¹⁴³

OMB eventually established a numerical threshold to define "major" action. Regulations with an expected economic impact of \$100 million per year were classified as major,¹⁴⁴ and hence required an IIS. The agencies, however, proved adept at getting around this new requirement by spacing out the effect of important regulations over several years and by dividing regulatory programs so that effects of individual components fell below the \$100 million threshold.¹⁴⁵

NRC, already using cost-benefit analysis, chose not to implement the Executive orders and OMB guidelines. Its officials asserted that NRC was an independent commission not subject to these executive requirements, and that its sensitive task of controlling substantial radiation hazards should not be shaped by inflationary impact considerations.¹⁴⁶ Agency analysts expressed difficulties in integrating IIS analysis and procedures with preexisting regulatory analyses derived from statutory mandates and administrative practices.¹⁴⁷

Agencies such as EPA and OSHA, which administer statutes that allow only limited consideration of economic factors, viewed the IIS procedure as an unnecessary requirement inhibiting implementation of their statutory mandates and adding to their already considerable administrative burdens.¹⁴⁸ Furthermore, OMB and the agencies did not require the IIS and background analytical documents to be included in the decision record, and therefore subject to public disclosure and eventual judicial review under the requirements of the Administrative Procedure Act¹⁴⁹ and Freedom of Information Act.¹⁵⁰ Thus, the IIS procedure avoided the public participation and judicial review that could ensure accountable agency use of cost-benefit analysis.¹⁵¹

143. Although an EIS was prepared for the entire project, 39 Fed. Reg. 33,843 (1974), economic analyses were only prepared for subgroups within the project. See, e.g., 41 Fed. Reg. 29,425 (1976).

144. Office of Management and Budget, U.S. Executive Office of the President, Memorandum *re* Uniform Criteria (June 3, 1975).

145. Interviews with OMB and COWPS staff in Washington, D.C. (Fall 1978).

146. *Id.*

147. *Id.*

148. EPA, in particular, regarded the program with special skepticism because it was administered by OMB. EPA had been the main focus of the Nixon Administration's "Quality of Life" review. According to some observers, OMB used this review process to diminish EPA achievements in protecting environmental quality and to delay important actions. See [1976] 7 ENVIR. REP. (BNA) 693.

149. 5 U.S.C. §§ 500-703 (1976).

150. *Id.* § 552.

151. Despite these shortcomings, the IIS program might have influenced agency decisionmaking considerably if courts enforced the requirements of Executive Order 11821 in private lawsuits. In *Independent Meat Packers v. Butz*, 526 F.2d 228 (8th Cir. 1975), *cert. denied*, 424 U.S. 966 (1976), the court held that private parties cannot enforce the requirement to prepare an IIS because the IIS program "was intended primarily as a managerial tool for implementing the President's personal economic policies and not as a legal frame-

These inadequacies of the IIS process were significant since OMB supervision guided the cost-benefit analysis practices of many federal agencies. As a result, wide variation in agency practice developed. The Federal Energy Administration (FEA), for example, concluded that its procedures for economic analysis developed in response to the IIS Executive orders satisfied its statutory obligations.¹⁵² Other agencies prepared IIS pursuant to NEPA or other statutory authority, subject to various procedural safeguards.

Moreover, OMB and COWPS personnel acknowledge that OMB did not develop satisfactory procedures for assuring that agencies applied the IIS requirements and conducted cost-benefit analyses in good faith.¹⁵³ In addition, placing the IIS program under the exclusive jurisdiction of OMB removed key decisions concerning the identification of costs and benefits, discount rates, and valuation of intangible benefits from wider public control. For example, OMB established a ten percent discount rate for evaluating costs and benefits distributed over time, without congressional or public participation.¹⁵⁴

During this period, COWPS asserted its authority to monitor and analyze inflationary impacts throughout the economy.¹⁵⁵ COWPS' reviews of proposed agency rulemaking under its own statutory authority¹⁵⁶ are filed with the agency during the public comment period and therefore are available to the public.¹⁵⁷ COWPS reviews also occur off the agency record when CEA and various individual aides to the President ask COWPS to provide staff and analyses on economic matters.¹⁵⁸ Given these opportunities, COWPS has actively participated in agency proceedings subject to IIS and subsequent Executive order require-

work enforceable by private civil action." *Id.* at 234-36. See also *National Renderers Ass'n v. EPA*, 541 F.2d 1281 (8th Cir. 1976) (court refused to base private party's successful challenge of EPA new source standards on Executive Order 11821). By the same token, procedural or methodological deficiencies in cost-benefit analyses included in an agency IIS presumably could not be challenged in private lawsuits.

152. See Brookhaven Report, *supra* note 17, at 171-92.

153. Interviews with staff of OMB, COWPS, and agencies subject to OMB memoranda in Washington, D.C. (Fall 1978).

154. Office of Management and Budget, U.S. Executive Office of the President, Circular No. A-94 *re* Discount rates to be used in evaluating time-distributed costs and benefits (Mar. 27, 1972).

155. Council on Wage and Price Stability Act, Pub. L. No. 93-387, 88 Stat. 750 (1974) (codified at 12 U.S.C. § 1904 (1976 & Supp. 1 1977)). Council authority was most recently extended to September 30, 1980, by Pub. L. No. 96-10, 93 Stat. 23 (codified at 12 U.S.C.A. § 1904 (West Pamphlet 2, 1979)).

156. COWPS is authorized to review and intervene in agency and department proceedings. 12 U.S.C.A. § 1904 note (3)(a)(7), (8) (West Supp. 1979).

157. Editor's telephone interview with Roy Nierenberg, COWPS Deputy General Counsel (Jan. 21, 1980).

158. Interview with Roy Nierenberg, COWPS Deputy General Counsel and John Morales, COWPS Senior Economist, in Washington, D.C. (Dec. 1978).

ments.¹⁵⁹

While the Ford Executive orders were in effect, COWPS reviewed IIS's prepared by agencies, assessing them independently and commenting on their inflationary impact. COWPS also began intervening aggressively in agency proceedings "to present its views as to the inflationary impact that might result from the possible outcomes of such proceedings" although the Council has "no legislative authority to impose mandatory controls nor . . . to prevent or delay any federal agency action."¹⁶⁰

In a typical case, COWPS appeared before the Consumer Product Safety Commission in 1977 and presented extensive testimony on CPSC's proposed power lawn mower safety standard. COWPS' testimony stated several bases for its objection to the proposed standards—primarily that they were based on insufficient information and that COWPS' estimates show costs exceeding benefits.¹⁶¹ COWPS presented estimates that the first-year cost of the standard would be greater than \$371 million, that sales would decrease, and that the dollar benefits of reducing the annual tolls of injury and death (56,000 injuries and twenty-five deaths in 1976) would probably fall below \$163 million, thereby producing an unfavorable benefit to cost ratio.¹⁶²

Earlier COWPS comments reveal its untested assumptions about social costs. For example, COWPS disputed estimates that the "cost of a day incapacitated" was forty dollars and that an average wage rate of \$225 per week be used in calculating the costs of permanent disability.¹⁶³ It assumed that any pain and suffering costs, as proposed by others appearing before CPSC were overestimated,¹⁶⁴ and that the value of life amounts proposed were probably overestimated to the extent they exceeded the \$240,000 amount estimated by the National Highway Traffic Safety Administration.¹⁶⁵

CPSC responded by internally disputing, in part, COWPS' estimates and other aspects of its cost-benefit analysis methodology, and its primary reliance on cost-benefit in setting health and safety regulations

159. In a quarterly report, for example, COWPS revealed its selective involvement in OSHA proceedings on machine guards and benzene exposure, CPSC proceedings on power lawn mowers, and its filing of numerous reports on other health, safety, and environmental problems within the regulatory jurisdiction of EPA, OSHA, CPSC, FDA and other agencies. COUNCIL ON WAGE AND PRICE STABILITY, U.S. EXECUTIVE OFFICE OF THE PRESIDENT, QUARTERLY REPORT at iv (Oct. 1977).

160. *Id.* at 9-12.

161. Council on Wage and Price Stability, Comments before the Consumer Product Safety Commission on Power Lawn Mowers under 16 C.F.R. § 1205 (Aug. 12, 1977).

162. *Id.* at 7-14.

163. Council on Wage and Price Stability, Comments before the Consumer Product Safety Commission on Proposed Lawn Mower Safety Standard 9-10 (Oct. 14, 1975).

164. *Id.* at 9-13.

165. *Id.* at 12.

under its enabling act.¹⁶⁶ In February 1979 CPSC published a final standard which is not effective until January 1982.¹⁶⁷ While influencing CPSC's balancing analysis and the ultimate standard, COWPS delayed the promulgation of the safety standard.

COWPS repeatedly has demonstrated this disturbing ability to influence safety standards and delay agency action by using economic studies laden with arbitrary assumptions about health and other matters that transcend economic expertise. The significant roles played by COWPS and OMB under the Ford Executive orders rested on no particular expertise about, nor demonstrated concern for, the social, environmental, and other noneconomic issues involved.

In 1976 COWPS and OMB solicited agency and public comments on the IIS program¹⁶⁸ and received a wide variety of guarded criticisms, particularly from the health, safety, and environmental regulators.¹⁶⁹ Executive Order 11949¹⁷⁰ subsequently extended the IIS program until the end of 1977.¹⁷¹

B. Carter Administration "Regulatory Analysis" Executive Order

1. Executive Order 12044

The Carter administration, faced with the need to control inflation and with increasing criticism of federal regulation, promulgated Execu-

166. See Internal Memorandum of Consumer Product Safety Commission, *re* Power Lawn Mower Comments (Feb. 6, 1978).

167. 44 Fed. Reg. 9990 (1979) (to be codified in 16 C.F.R. § 1205).

168. 41 Fed. Reg. 32,463 (1976).

169. For example, the Department of Commerce called for "specific guidelines" to assure "uniform applications, similar to environmental impact statement guidelines of the U.S. Council on Environmental Quality." EPA recommended phasing out the IIS program and felt that "there are definite limitations in the state of the art of benefits estimation in the environmental areas." HEW felt that "the analyses should be public as a matter of principle" and a staff analysis pointed out the "many pitfalls in application" of cost-benefit analysis. The Food and Drug Administration recommended discontinuance. The Department of Labor commented that the IIS program had not clearly encouraged "better planning and management within government." Letters on file with OMB in response to 41 Fed. Reg. 32,463 (1976). Nevertheless, COWPS' summary report indicates little agency opposition to the IIS program. See Council on Wage and Price Stability and Office of Management and Budget, *An Evaluation of the Inflation Impact Statement Program* (Dec. 7, 1976).

170. 3 C.F.R. 161 (1977 Compilation).

171. *Id.* at 162. The Carter administration indicated, however, that the evaluation of economic impact by regulatory agencies would be reconsidered. CEA then circulated drafts for new economic analyses. One of the most significant CEA departures from Ford administration practice was its proposed modification of the cost-benefit approach being used in all economic analyses. CEA indicated that it would stress selection of the least costly regulatory alternative—a cost-effectiveness approach—and that therefore CEA would address the methods of achieving regulatory goals without attempting to influence the establishment of the goals themselves. See [1977] 8 ENVIR. REP. (BNA) 581. For EPA's response to the CEA draft guidelines, see *id.* at 699. This proposed approach was not followed, however, after enactment of President Carter's Executive Order 12044.

tive Order 12044 on March 23, 1978.¹⁷² The Order requires agencies to prepare a "regulatory analysis" for all regulations having an annual impact of at least \$100 million on the economy or causing a "major" price increase for an industry, level of government, or geographic area.¹⁷³ Each analysis must state the problem addressed, describe the economic consequences of alternative solutions, and explain the selection of one alternative over the others.¹⁷⁴ The Order provides for public notice of preliminary analyses and periodic review of existing regulations. It directs OMB to ensure effective implementation.¹⁷⁵

The new Executive order affords OMB, CEA, and COWPS considerable discretion to shape agency use of regulatory analysis. OMB, CEA, and COWPS have used this freedom to reinstate the cost-benefit analysis practices of the earlier Ford Executive orders that the Carter administration ostensibly sought to avoid.¹⁷⁶ OMB has issued a memorandum to implement Executive Order 12044 by providing the agencies with "guidance on the contents of a regulatory analysis."¹⁷⁷ The guidance, developed with CEA and COWPS, requires agencies to compare the economic consequences of each alternative regulation and explain the reasons for choosing one alternative over the other.¹⁷⁸

172. 3 C.F.R. 152 (1978 Compilation). The Order also calls on agencies to minimize paperwork, publish a semiannual agenda of proposed regulations and existing regulations under review, and improve public participation and the oversight role of agency administrators in regulatory proceedings. *Id.* at 153. In addition, agencies are to use new criteria in developing final regulations including the writing of regulations "in plain English," evaluation of alternatives to regulation, and estimation of reporting burdens created by the proposed regulations. *Id.* at 154.

173. *Id.*

174. *Id.*

175. *Id.* at 155-56. As of September 1978, virtually all agencies subject to Executive Order 12044 had published their proposed implementing regulations in the Federal Register. Regulatory analyses were not required in pending rulemaking proceedings if an Economic Impact Statement had already been prepared in accordance with Executive Orders 11821 and 11949. *Id.* at 155.

176. See J. Morall, Regulatory Reform in the Carter Administration 5 (paper presented at the Allied Social Science Associations Annual Meeting in New York, Dec. 28, 1977).

177. Memorandum from Wayne G. Granquist, Associate Director for Management and Regulatory Policy, Office of Management and Budget, to the Heads of Departments and Agencies, entitled "Regulatory Analysis" (Nov. 21, 1978) [hereinafter cited as OMB Memorandum on Regulatory Analysis].

178. *Id.* The memorandum provides, *inter alia*, that each agency analysis contain:

(3) An analysis of the economic consequences—direct as well as indirect effects, and their significance—of each of these alternatives (including the no action alternative); such consequences should be presented in comparative form to sharpen the issues and provide a clear basis for choice among alternatives; these consequences include:

(a) specific burdens imposed by each alternative

(i) what types of burdens (and how much) are placed on specific groups as a result of compliance?

• capital outlays

• other costs of compliance including operating and maintenance costs

Executive Order 12044 and the OMB memorandum do not use the terms cost, benefit, or cost-benefit analysis. Instead, they use the terms burdens, gains, and overall economic impact. Nevertheless, their practical effect has been to authorize the continued use of cost-benefit analysis.¹⁷⁹

2. *Regulatory Analyses Conducted by the Regulatory Analysis Review Group and the Council on Wage and Price Stability*

The newly established Regulatory Analysis Review Group (RARG) chaired by the CEA and staffed by COWPS,¹⁸⁰ conducts a limited number of special economic analyses in addition to those imposed on the agencies under Executive orders and statutes enforced by OMB, COWPS and CEA. President Carter stated that RARG's role is "to review agency regulatory analyses and to consult with the agencies on the conduct of such analyses," and "to conduct an interagency re-

-
- administrative burden (reporting requirements, delays, uncertainty, etc.).
 - (ii) who bears those burdens?
 - what burden falls on what types of enterprises, levels of government, major geographic regions, communities, and urban areas? (e.g., the impact on employment, fiscal condition, availability of public services, etc.)
 - how are consumers and various population groups burdened? (e.g., income distribution, housing availability, etc.).
 - (b) specific gains produced
 - (i) what types of specific gains (and how much) to society as a whole would each alternative produce?
 - (ii) who would be helped, how, and by how much, by each alternative?
 - (c) overall economic impacts of each alternative
 - (i) how would productivity and overall economic efficiency be affected?
 - (ii) how would prices and employment be affected?
 - (iii) how would the U.S. foreign trade position be affected (e.g., effect of increased costs for domestic companies on the price of goods that compete with imports, effect of increased costs for domestic companies on the price of U.S. exports, effect on the quality or utility of products and thus on the demand for U.S. exports, extent to which foreign competitors are subject to similar regulations, effect on competition between U.S. and foreign suppliers in third countries)?
 - (4) A detailed explanation of the reasons for choosing one alternative over the others; questions to be answered:
 - (a) Will the selected alternative produce the intended results in the least burdensome manner possible? If not, why is this the preferred alternative?
 - (b) Why isn't the action more stringent?—less stringent? What tradeoffs does the selected alternative reflect?

Id. at 3-4. For other OMB promulgations implementing Executive Order 12044, see 43 Fed. Reg. 21,997 (1978); 43 Fed. Reg. 24,219 (1978).

179. See J. Morall, *supra* note 176.

180. President Carter informally established RARG to consult with agencies and to review agency regulatory analyses prepared under Executive Order 12044. 43 Fed. Reg. 12,668 (1978).

view of 10-20 regulatory analyses each year."¹⁸¹ CEA, however, directed RARG to use cost-benefit analyses that are substantially similar to the regulatory analysis requirements that OMB imposes on the agencies.¹⁸² RARG's Executive Committee selects certain agency proposals for detailed analysis on the basis of several criteria, including potential economic impacts and total cost, the precedential value of RARG action, regulatory overlap or conflicts between agencies, and the inadequacy of the agency's own regulatory analysis.¹⁸³

COWPS typically takes two to four weeks to produce a draft analysis for RARG.¹⁸⁴ When RARG reaches a consensus on the draft, Presidential aides may also review the report before the COWPS Director files the report for the agency record. RARG members may file dissenting opinions. Although RARG's deliberations are closed to the public, its reports are filed for the agency record, which is available to the public.

The ultimate reconciliation of an agency's regulatory analysis and the RARG report rests with the agency. But as a practical matter, RARG exerts considerable influence on the agency. This influence may result in part from new, convincing data, exposure of deficiencies in the agency's own analysis, or RARG's innovative regulatory approach.¹⁸⁵ The primary reason for RARG's influence, however, is that its reports issue directly from the Office of the President.¹⁸⁶

COWPS lacks a uniform policy for dealing with many methodological limitations of cost-benefit analysis¹⁸⁷ that it encounters when

181. *Id.*

182. Compare Memorandum from Regulatory Analysis Group, Council of Economic Advisors, U.S. Office of the President, entitled "Regulatory Analysis" (undated, but issued summer, 1978) with OMB Memorandum on Regulatory Analysis, *supra* note 177.

Given the narrow economic course set for the agencies and RARG by OMB and CEA, pressures developed to create yet another regulatory oversight organization to deal more readily with the societal benefits of health, safety, and environmental programs and to be more favorably disposed to their implementation in the face of economic analyses. This led to Carter's creation of the Regulatory Council, following the suggestions of EPA officials. See Memorandum from President Carter to Executive Departments and Agencies, entitled "Strengthening Regulatory Management" (Oct. 31, 1978). For some preliminary indications as to the Council's agenda, see 5 EPA J. 29 (1979). The Council intends to establish a regulatory calendar providing an overview of all agency activities and to improve benefit calculations. The OMB staff, however, believes that trying to place a conclusive value on benefits will only lead to further controversy. Interviews with Peter Petkas, Executive Director of the Regulatory Council, and OMB and COWPS staff, in Washington, D.C. (Fall 1978).

183. Interview with John Morales, COWPS Senior Economist, in Washington, D.C. (Dec. 1978).

184. Discussion of RARG procedure based on interviews with COWPS staff economists and attorneys in Washington, D.C. (Fall 1978).

185. The RARG process has been characterized by OMB and COWPS staff as a reasonable approach to increased agency awareness of the excessive regulation problem. *Id.*

186. *Id.*

187. See text accompanying notes 27-65 *supra*.

preparing regulatory analyses for RARG or under its own independent statutory authority.¹⁸⁸ Each analyst selects a discount rate and estimates critical factors, such as the economic valuation of health and environmental benefits and the allocation of costs and benefits to different societal sectors, without any meaningful guidelines.¹⁸⁹ COWPS staff contend that this ad hoc approach results from the different styles of analysts and the differences between proposed regulations.¹⁹⁰ In addition, RARG analyses incorporate technical positions and studies done by the OSTP¹⁹¹ even though these reports are much less thorough and sophisticated than the original agency study.¹⁹² Despite the absence of a consistent approach to methodological problems, RARG reports filed in 1978¹⁹³ reveal its preferences for performance standards over design standards, incremental economic incentives over standards enforced by fixed penalties, and individual choice over government-dictated outcomes. These preferences, which occasionally lead to recommended innovative regulatory approaches, challenge the justifications for agency action.

An additional assumption consistently injected into COWPS' analyses is the necessity for maintaining the economic status quo. COWPS does not encourage either redistributing income or impairing the economic status of regulated firms to solve a health, safety, or environmental problem. COWPS believes that agencies share this assump-

188. Council on Wage and Price Stability Act, 12 U.S.C.A. § 1904 note (West Supp. 1979).

189. Interview with COWPS staff in Washington, D.C. (Fall 1978).

190. *Id.*

191. Congress created OSTP by the Presidential Science and Technology Advisory Organization Act of 1976, Pub. L. No. 94-282, 90 Stat. 463 (codified at 42 U.S.C. 6611 (1976)), following the recommendations of President Ford. Executive Order 12039, 43 Fed. Reg. 8095 (1978), transferred various advisory functions to it. OSTP has become a consulting service organization providing technical support for the analyses and recommendations COWPS provides RARG. See Report of Dr. Frank Press, Director, OSTP, to the House Committee on Science and Technology (Oct. 31, 1978), which describes in some detail numerous OSTP functions, but nowhere describes its role of serving COWPS and RARG other than alluding to "numerous other areas where equal [OSTP] attention is given to contemporary issues, usually with action-oriented policy or management decisions in mind."

192. See, for example, the RARG report for EPA's proposed revision of the national ambient air quality standards for photochemical oxidants (the ozone standard), 43 Fed. Reg. 26,962 (1978). The report criticizes EPA reliance on the consensus of expert panels, existing research and literature, and monitoring systems in establishing its proposed rule, but presents little evidence to support its own preferences.

193. In 1978, RARG filed reports with agencies on four proposed agency actions: EPA's national ambient air quality standards for photochemical oxidants (filed Oct. 16, 1978); OSHA's rules on worker exposure to acrylonitrile (filed May 19, 1978); Department of Transportation's rules on nondiscrimination against the handicapped (filed Oct. 24, 1978); and OSHA's rules on toxic substances posing a potential occupational carcinogenic risk (filed Oct. 24, 1978).

tion.¹⁹⁴

COWPS usually files its own analysis of a proposed rule for the agency record during the public comment period.¹⁹⁵ Frequently, however, it conducts a second review of the final regulation after the close of the comment period and before publication.¹⁹⁶ The CEA and other Presidential aides initiate these additional COWPS reviews, which are then used off the record and in ways beyond COWPS' formal control.¹⁹⁷ COWPS analyses so used wield additional influence, regardless of any arbitrary assumptions and inadequate technical arguments they might contain. Because of such *ex parte* influence and record deficiencies, subsequent judicial review of the final agency action cannot ensure that the agency acted properly on the basis of available evidence.¹⁹⁸

Several agencies and interest groups have expressed opposition to RARG activities. EPA, for example, disagreed strongly with the RARG report on EPA's proposed photochemical oxidants regulation.¹⁹⁹ EPA considered the approach illegal because it calls for a consideration of cost prohibited by the Clean Air Act, inadequate because it fails to provide for full review of all available medical evidence, and inaccurate because it overstates control cost estimates.²⁰⁰ Despite the apparent weaknesses of the technical criticisms expressed by COWPS

194. Interview with John Moralles, COWPS Senior Economist, and Roy Nierenberg, COWPS Deputy General Counsel, in Washington, D.C., (Dec. 1978).

195. *Id.*

196. *Id.*

197. *Id.*

198. See the discussion of agency contacts with interested persons under Executive Order 12044, 43 Fed. Reg. 36,412 (1978):

The agency should address the question of how it handles contacts with persons interested in a developing rule. Such frequent and informal contacts between agency decisionmaking personnel and interested outsiders at this stage of the process are unavoidable and usually desirable. Yet they may give rise to suspicions of improper influence, particularly where the pattern of contacts seems disproportionately to favor particular requirements, preparation of memoranda of significant contacts for inclusion in the rulemaking file, open meetings, and conscious efforts to balance contacts.

Id. at 36,417. See also, Putting *Ex Parte* Communications in the Record, *id.* at 36,419.

A Justice Department memorandum concludes that there is neither a constitutional nor a statutory bar to contacts between presidential aides and agency rulemakers if procedural safeguards of this type are observed. Memorandum from Larry A. Hammond, Acting Assistant Attorney General, Office of Legal Counsel, to Cecil D. Andrus, Secretary of the Interior, entitled, "Consultation with Council of Economic Advisors Concerning Rulemaking under Surface Mining Control and Reclamation Act," (Jan. 17, 1979). See also Nathanson, *Report to the Select Committee on Ex Parte Communications in Informal Rulemaking Proceedings*, 30 AD. L. REV. 377 (1978); Wright, *Rulemaking and Judicial Review*, *id.* at 461.

199. See note 192 *supra*.

200. Memorandum from Walter C. Barber, Director, Office of Air Quality Planning and Standards, to David G. Hawkins, Assistant Administrator for Air, Noise, and Radiation, *re* Council on Wage and Price Stability/Regulatory Analysis Review Group Critique of the Proposed Ozone Ambient Air Quality Standard (Nov. 8, 1978).

and OSTP, they strongly influenced the outcome; EPA's final standards were significantly less stringent and less protective of health than its proposed rules.²⁰¹ The final standards, however, presumably will "cost" less than the proposed standards.

The Environmental Defense Fund (EDF) considers RARG a threat to "important commitments . . . to the health and welfare of the American people, with little or no effect on inflation or government efficiency."²⁰² EDF has sought (1) to confine RARG's activities to the public comment period; (2) to have RARG file a summary of its meetings with agency officials for the agency record; (3) to have RARG open all its meetings to the public; and (4) to prevent RARG from delaying the regulatory process, particularly prior to proposed rulemaking. EDF, RARG, and other Presidential advisors have discussed these issues, but no changes have resulted in RARG policy to date.²⁰³

The controversy continues in the media²⁰⁴ and in Congress. In February 1979 Senator Muskie conducted hearings of the Senate Subcommittee on Environmental Pollution "to assess the merit, legality and political ramifications of the White House economists' roles in environmental regulations."²⁰⁵ The chairmen of COWPS and CEA testified, along with representatives of various environmental organizations.²⁰⁶

201. 44 Fed. Reg. 8202 (1979) (to be codified in 40 C.F.R. pt. 50). In its summary of the final rulemaking, EPA outlined the extent to which it changed its position:

On June 22, 1978, EPA proposed changes in the standard (43 FR 26962) based on the findings of the revised criteria. The proposed changes included (1) raising the primary standard to 0.10 ppm, (2) retaining the 0.08 ppm secondary standard, (3) changing the chemical designation of the standard from photochemical oxidants to ozone, and (4) changing to a standard with a statistical rather than deterministic form. The final rulemaking will make three further changes in the standard: (1) Raising the primary standard to 0.12 ppm, (2) raising the secondary standard to 0.12 ppm, and (3) changing the definition of the point at which the standard is attained to "when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is equal to or less than one."

Id. EPA asserted that the changes, deemed harmful by many, were not the result of a trade-off between health and economic considerations or a RARG type of economic analysis. *Id.* at 8213.

202. See letter from Robert J. Rauch, Staff Attorney, Environmental Defense Fund, to Charles Schultze, Chairman, Council of Economic Advisors (July 19, 1978).

203. The Center for Law and Social Policy, the Natural Resources Defense Council, the Appalachian Coalition, the Council of the Southern Mountains, Inc., the Northern Plains Resources Council, Illinois South, and the Texas Committee on Natural Resources have filed a consolidated action challenging ex parte contacts between members of CEA and the Department of the Interior in connection with proposed permanent strip mining regulations. COWPS prepared a report on behalf of RARG concerning the proposals in early 1979, which CEA members allegedly passed on to the Department of the Interior after the public comment period had closed. *In re Permanent Surface Mining Regulations Litigation*, No. 79-1144 (D.D.C., filed June 6, 1979).

204. See, e.g., *Should Presidents Bend the Rules?*, N.Y. Times, Feb. 14, 1979, § A, at 24, col. 1.

205. [1979] 9 ENVIR. REP. (BNA) 1993.

206. See *Executive Branch Review of Environmental Regulations: Hearings Before the*

3. Regulatory Reform: Conflicts and Opportunities

Regulatory reform is in a state of flux, as COWPS, CEA, OMB, RARG, OSTP, the new Regulatory Council (RC),²⁰⁷ agencies, and Congress²⁰⁸ respond to Executive Order 12044. Controversy grows over the use of regulatory analyses, the adequacy of the methodologies employed, and the proper degree of Presidential involvement in agency decisionmaking. Regulatory reviews conducted under President Carter's Order provide new opportunities to influence agency actions on economic grounds under the aegis of the Office of the President, regardless of the merit of the analytical approaches used. Without uniform guidance on the critical methodological limitations of cost-benefit analysis, important public policy issues raised by these limitations are left to staff economists, consultants, and Presidential advisors.²⁰⁹ Regulatory cost-benefit analysis has become a numbers game that eludes accountability.

Arguably, flexibility may be justified while agencies learn to analyze costs, benefits and alternative regulatory actions. OMB staff acknowledge the need for formalization, but not until they gain five or six years of experience with Executive Order 12044 and the regulatory cal-

Subcomm. on Environmental Pollution of the Senate Comm. on Environment and Public Works, 96th Cong., 1st Sess. (1979).

207. See note 182 *supra* on the creation of the Regulatory Council.

208. Congress is now assessing the President's efforts and considering its own initiatives. Senators Ribicoff, Kennedy, and others introduced a bill "to provide for the regulatory analysis of proposed rules and the review of existing rules by the agencies." S. 262, 96th Cong., 1st Sess. § 602 (1979). The bill carefully provides that the agency draft and final regulatory analyses for proposed major rules include estimates of "projected economic, and projected health, safety and other noneconomic effects . . . which the agency is permitted by law to take into account." *Id.* § 603.

The bill, however, provides no intelligible principle for agency consideration of both quantifiable economic factors and unquantifiable noneconomic factors such as health, safety, and environmental effects. Nor does the bill provide any guidance for valuing unquantifiables, for using discount rates, or for determining appropriate distributions of the effects across societal sectors. The bill, if enacted, may well dissuade agencies from undertaking purely economic analyses of the type fostered by Executive Order 12044. Conversely, however, it may provide the necessary authority for agencies to incorporate all these considerations into a cost-benefit analysis or regulatory analysis type of framework, with predictable problematic results.

Furthermore, the bill provides that "[a]ny regulatory analysis prepared . . . under . . . this title, including any procedure involved therein . . . shall not be subject to any judicial review in any court." *Id.* § 607. Without the accountability provided by judicial review, and without consistent and vigorous oversight by Congress of agency regulatory analyses, the agencies will have considerable discretion to use and abuse regulatory analysis.

It should be noted that in most respects relevant to this Article, S. 262 is substantially similar to S. 755, the "President's bill" filed in 1979 to promote legislative enactment to Executive Order 12044 requirements. As of publication date, the Senate has not acted on either bill.

209. OMB and CEA guidelines are couched in general terms and are silent on key methodological problems. See text accompanying notes 176-79 *supra*.

endar.²¹⁰ They believe that formalization now would force agencies and Presidential offices to misallocate their resources by directing agency personnel to focus on trivial aspects of their decisions.²¹¹ In addition, OMB staff fear that articulation of assumptions could lead to litigation, with decisions on controlling costs being made in the courts, similar to the NEPA experience.

This desire to maintain flexibility explains OMB's failure to promote its ten percent discount rate memorandum²¹² or to promulgate standardized approaches to the valuation or distribution of effects issues. OMB thus preserves the executive branch staff's discretion for dealing with precisely those persistent methodological problems that transcend analyst expertise.

Finally, the roles of RARG, RC, COWPS, OMB, CEA, OSTP, special Presidential advisors, and the agencies themselves in the regulatory reform process are overlapping and unclear. Guidelines have been issued in an inconsistent and uncoordinated manner, while earlier memoranda, such as OMB's 1972 circular on the ten percent discount rate²¹³ are ignored, but remain unrevoked, creating confusion among regulated firms, interest groups, and the public. Cost-benefit analysis has been acclaimed as a panacea for many perceived ills of the regulatory decisionmaking process; however, a clear need exists to reform this reform program through coordination of review functions and generic treatment of persistent methodological problems.

V

AGENCY STRUCTURING OF DISCRETION IN COST-BENEFIT ANALYSIS

Congress, CEQ, COWPS, RARG and OMB all have failed to address fully the significant methodological limitations and high potential for abuse of cost-benefit analysis. One solution, in the absence of meaningful legislative oversight or guidance to agency decisionmakers, is agency self-regulation.

Courts expect agencies to structure their decisionmaking discretion through rulemaking, thereby promoting agency reliability, predictability, and accountability.²¹⁴ Professor Davis is the leading proponent of this view: "When agencies have inadequately provided guides for their exercise of discretion, courts . . . should require clarification through

210. Interview with OMB staff in Washington, D.C. (Dec. 1978).

211. *Id.*

212. Office of Management and Budget, U.S. Executive Office of the President, Circular No. A-94 *re* Discount Rates to be Applied in Evaluating Time-Distributed Costs and Benefits (Mar. 27, 1972).

213. *Id.*

214. K. DAVIS, ADMINISTRATIVE LAW TEXT 143, 148 (1972).

rules or standards. The combination of such clarification with required statement of findings and reasons in individual cases is one of the most important arrangements for protecting against arbitrary exercise of discretionary power."²¹⁵ Davis believes that administrators "are clearly in the best position" to confine administrative power

because they have the most direct knowledge of practical needs with respect to [that] power.

. . . .

. . . The improvement in the quality of justice may stem from three interlocked items—the guides for discretion, the control of discretion through the requirement that findings and reasons . . . be related to the guides, and the increased effectiveness of the judicial check.²¹⁶

Explaining the procedures and assumptions of agency decision-making will improve agency accountability and foster an adequate record for judicial review, particularly review of informal rulemaking. Judge Wright has stated:

[I]f courts are going to make a searching and careful review of the facts in an informal rulemaking proceeding, they will need a proper record. How will a court determine whether the agency's action is arbitrary or capricious or supported by substantial evidence without a record? In spite of continuing exhortations and admonitions from many courts, including our own, today's informal rulemaking proceedings often do not provide a proper record.

Some government agencies and departments seem to be operating under the old assumption that agency expertise is a proper blanket with which to insulate themselves from searching judicial review. But the insulation is occurring at a time when lower courts are being required by the Supreme Court to pierce the blanket and get to the facts *and* the underlying policy considerations—not to weigh them but to consider them to determine whether the agency action under review is rational.²¹⁷

This review of legal, methodological, and institutional issues associated with the extended use of cost-benefit analysis suggests several

215. *Id.* at 156. Agency articulation on a case-by-case basis of how discretion is used also can improve agency accountability. COWPS itself, in its major study of the inflationary impact statement program, called for agency explicitness on a case-by-case basis:

The cost-benefit analyses of the proposed regulations that have been performed on OSHA regulations have been done by other Federal agencies such as CWPS and EPA. If [the Department of Labor's] IIS's were structured so as to reveal explicitly the costs and benefits of alternative proposals it would be stronger evidence than is presently available that OSHA views its IIS analysis as a management tool for improving regulatory decision-making rather than as a hurdle to overcome in promulgating regulations.

U.S. Council on Wage and Price Stability and U.S. Office of Management and Budget, *An Evaluation of the Inflation Impact Statement Program* 68 (Dec. 7, 1976). Furthermore, the OMB guidelines also call for agency articulation on a case-by-case basis in rulemaking. OMB Memorandum on Regulatory Analysis, *supra* note 177.

216. K. DAVIS, *supra* note 214, at 144, 148.

217. Wright, *supra* note 198, at 464.

criteria to measure agency self-regulation of discretion: (1) statutory authority should clearly guide agency choice of analytical methods; (2) an agency should develop appropriate methods for dealing with methodological limitations; (3) an agency should promulgate generic rules to limit ad hoc arbitrary assumptions; and (4) an agency should conduct its cost-benefit analysis in good faith, as indicated by the timing and weight it accords cost-benefit analysis in its decisions. These criteria are considered below in the context of two agencies that use cost-benefit analysis in decidedly different ways, NRC and EPA.

A. Statutory Authority and Guidance for Use of Cost-Benefit Analysis

Federal agencies draw support for using cost-benefit analysis in their decisionmaking process from a variety of sources: NEPA, Executive orders, enabling statutes, and agency discretion. At present, agencies do not consistently identify the source of authority for using cost-benefit analysis although important legal issues, such as the degree of public participation required, often depend upon the particular authority relied upon.²¹⁸ Judicial review of cost-benefit analysis decisions also depends upon the legal authority that determined the agency's analytical method. For example, an NRC cost-benefit analysis in a reactor licensing proceeding carried out under NEPA must meet the Act's detailed statement requirement,²¹⁹ including additional requirements developed by the judiciary in construing NEPA.²²⁰ On the other hand, an NRC cost-benefit analysis carried out under other authority, such as the Atomic Energy Act, must provide reasonable assurance that public health will be protected.²²¹ Furthermore, if agencies stated the implications of using various cost-benefit analysis authority and identified the authority actually relied upon, the agency's legal basis for adopting a particular methodological approach would be open to congressional, judicial, and public scrutiny.

218. For example, an agency performing cost-benefit analysis pursuant to NEPA is required to provide for public notice and comment, and may permit public hearings, in the preparation of environmental impact statements. NEPA § 102(2)(C), 42 U.S.C. § 4332(2)(C) (1976). See also *City of Romulus v. County of Wayne*, 392 F. Supp. 578, 585 (E.D. Mich. 1975). On the other hand, it may be difficult to secure a similar degree of public participation in cost-benefit analysis conducted pursuant to Executive Order 12044, particularly since the Order has been construed not to provide a private cause of action permitting citizens and regulated interests to intervene in the "Regulatory Analysis" process. See note 151 *supra*.

219. NEPA § 102(2)(C), 42 U.S.C. § 4332(2)(C) (1976). See text accompanying notes 69-71 *supra*.

220. *Calvert Cliffs' Coordinating Comm'n v. AEC*, 449 F.2d 1109 (D.C. Cir. 1971). See text accompanying notes 72-75 *supra*.

221. See *Citizens for Safe Power v. NRC*, 524 F.2d 1291 (D.C. Cir. 1975), for possible distinctions between NEPA and Atomic Energy Act cost-benefit analyses. See also *York Comm. for a Safe Environment v. NRC*, 527 F.2d 812 (D.C. Cir. 1975).

B. Acknowledgement of Cost-Benefit Analysis Limitations

Agencies frequently fail to discuss important methodological issues of cost-benefit analysis in their published decisionmaking record either because the full background of their cost-benefit analyses is not part of the record, or because key assumptions are made without public comment or congressional oversight hearings.²²² After *Crowther v. Seaborg*,²²³ NRC developed its cost-benefit analysis approach more fully than any other regulatory body. For example, the valuation of human life set by NRC for use in its cost-benefit analyses to establish reactor radiation emission controls requirements is \$1000 per whole-body rem and \$1000 per thyroid rem.²²⁴ Originally, this monetization of human life was set forth as an interim standard with the promise of subsequent hearings. Nevertheless, NRC recently announced its decision "not to conduct a hearing to refine or reduce the health cost figures previously adopted."²²⁵ The use of an "interim" valuation for a highly critical variable, without public hearing, is inconsistent with the politically responsive criteria for setting agency standards required by *Crowther v. Seaborg*.²²⁶

Under current licensing regulations²²⁷ NRC requires an applicant for a reactor permit to demonstrate (1) that the plant is cost-effective in light of governing economic, social, and environmental factors, and (2) that overall benefits outweigh aggregated costs.²²⁸ This review of alternatives seldom involves only commensurable factors. Especially problematic is the evaluation of alternative sites since it is unclear how NRC should value and compare unquantifiable environmental assets such as wetlands and unique ecosystems that differ from site to site.

Evaluation is further complicated because changes in population density around a plant during its operational life may affect its "cost"

222. Most agencies subject to Executive Order 12044 published proposed regulations for conducting "Regulatory Analyses." See note 172 *supra*. Review of the proposed regulations reveals that often the agencies did little more than restate the general requirements of the Order itself. See, e.g., the proposed regulations of CPSC, 43 Fed. Reg. 32,392 (1978) and the Department of Energy, 43 Fed. Reg. 18,634 (1978). But see EPA's proposed regulations, 43 Fed. Reg. 29,891 (1978).

223. 312 F. Supp. 1205 (D. Colo. 1970). See text accompanying notes 122-25 *supra*.

224. 10 C.F.R. pt. 50 app. I (1979).

225. 43 Fed. Reg. 22,253 (1978).

226. 312 F. Supp. 1205 (D. Colo. 1970). See text accompanying notes 122-25 *supra*. Other features of NRC's cost-benefit analyses may be called into question as well. For example, Appendix I of the regulation, 10 C.F.R. pt. 50 app. I (1979), provides no guidance on evaluating human mutagenic effects and other impacts on the lives of future generations and their environments.

227. 10 C.F.R. pt. 51 (1979). An applicant's environmental report must include a cost-benefit analysis which quantifies factors "to the fullest extent practicable." *Id.* § 51.20(b). The NRC draft environmental impact statement likewise must contain a preliminary cost-benefit analysis. See *id.* § 51.23(c).

228. Interview with NRC staff in Washington, D.C. (Fall 1978).

in terms of radiation exposure and attendant health effects. NRC's discretion in considering population growth when approving a plant site has been confirmed by the Supreme Court, provided the agency develops a "reasonable, consistently applied administrative interpretation" on this issue.²²⁹ Nevertheless, NRC lacks standards for incorporating distributional considerations into cost-benefit based licensing determinations despite radiation's greater impact on persons living near the plant or those particularly susceptible to radiation, such as children and pregnant women.

In addition, NRC use of cost-benefit analysis is inconsistent. Plant safety features, such as the emergency core cooling system, are not subject to cost-benefit analysis in the rulemaking and plant permit review processes because NRC believes costs cannot be considered when safety is an issue.²³⁰ There is no rational distinction, however, between safety features designed to prevent accidents and operational features intended to minimize the leakage of radioactive effluents. Since both "safety" and "operational" constraints reduce the possibility of radiation damage to humans and the environment, it is unclear why the latter should be regularly subject to cost-benefit based rulemaking, while the former are not. Perhaps this dichotomy reflects a reluctance to consider high-cost, low probability events; structural failures and resulting large-scale catastrophes could tilt the cost-benefit analysis against the intended agency action.²³¹

By comparison, EPA engages in cost-benefit analysis to some extent under several statutes and programs involving air, water, radiation, pesticides, and toxic chemicals, but without the methodological coherence or thoroughness of NRC.²³² For example, EPA analysis leading

229. Northern Ind. Pub. Serv. Co. v. Porter County Chapter of Isaak Walton League of America, Inc., 423 U.S. 12, 14 (1975).

230. Interview with Robert Minogue, NRC Standards Division, in Washington, D.C. (Aug. 1977).

231. Regulation of licensee activities is subject to NRC's "Value Impact Guidelines." This approach calls for sequential consideration of four questions: (1) the problem to be addressed by new regulation; (2) upper level constraints already established or to be established by NRC or other agencies; (3) alternative methods of reaching such objectives; and (4) the value and impact of each alternative. These guidelines recommend no particular analytical technique for the fourth step, but permit the use of cost-benefit analysis or, where goals are already established, cost-effectiveness analysis, as a method of choosing among alternative regulatory constraints. See Office of Standards Development, U.S. Nuclear Regulatory Comm'n, Memorandum entitled "SD Staff Guidance for Preparation of Value/Impact Statements" (Apr. 11, 1977).

Although the guidelines supply a valuable framework for structuring NRC decisions, they do not address the quantification issue, the discount rate, or other particular problems of using cost-benefit analysis in setting standards. Moreover, their precise scope and applicability are difficult to determine because it is unclear how to draw the line between reactor licensee activities that relate to safety and those that do not.

232. See discussion of NRC and EPA in Brookhaven Report, *supra* note 17, at 30-134.

to its environmental radiation standards for the uranium fuel cycle²³³ involved two critical findings, one technical, the other decidedly non-technical. First, EPA analysts compared the costs of radiation control to the number of adverse health effects avoided at each level of control. They found that beyond the point where potential adverse health effects would be reduced at the rate of one life per \$500,000, further life saving benefits would require large additional expenditures.²³⁴ Second, EPA justified selecting a standard based on this breakpoint in the cost-benefit curve because it felt the acceptable cost of saving an unspecified human life should not exceed \$500,000.²³⁵

Cynics might claim that EPA based its standard on NRC determinations of what controls the nuclear power industry could afford. In other words, EPA set a generous environmental standard to accommodate the maximum releases tolerable under NRC's site-specific reactor emission standards and to accommodate the potential number of reactors planned at any single site.²³⁶ Improving the quality of an agency's cost-benefit analyses cannot directly control the impact of this prodevelopmental bias. More responsible cost-benefit analyses, however, would allow the public to see that such factors do affect agency decisionmaking.

The question remains whether a federal administrative agency alone should make these decisions about critical methodological problems. Although analysis carried out under NEPA is open to public scrutiny, the potentially controversial valuation of human life justifying the ambient radiation standard did not attract public or congressional comment, perhaps because the EIS did not clearly distinguish EPA's objective measurement of risk from its subjective determination of a socially acceptable risk based on life-saving cost estimates. Yet an agency's obligation to articulate its assumptions should be greatest when its cost-benefit analysis includes such politically sensitive elements as a monetary value for human life.²³⁷

233. OFFICE OF RADIATION PROGRAMS, U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL RADIATION PROTECTION REQUIREMENTS FOR NORMAL OPERATIONS OF ACTIVITIES IN THE URANIUM FUEL CYCLE, FINAL ENVIRONMENTAL IMPACT STATEMENT (Nov. 1, 1976) (EPA Rep. No. 520/4-76-016).

234. *Id.* at 48.

235. *Id.* at 51; interview with Dr. William Rowe, Director of the Office of Radiation Programs, EPA, in Washington, D.C. (Fall 1978).

236. NRC believes up to five reactors can be sited together, provided each operates efficiently—limiting its offsite emissions to five millirems per reactor, or a 25 millirems total for the cluster of reactors. Interviews with NRC staff in Washington, D.C. (Fall 1978). The EPA ambient standard established in its separate regulatory proceeding is also 25 millirems, either a remarkable coincidence or a planned harmonization of results.

237. For several EPA proposals addressing these problems, see 43 Fed. Reg. 47,001 (1978). The planned initiatives include publication of regulatory analyses, promotion of citizen participation, and reimbursement for public participation.

C. *Development of Public Access "Regulatory Analysis" Under Executive Order*

It is uncertain whether cost-benefit analyses and related documents prepared in response to Executive orders are subject to timely public disclosure under the Freedom of Information Act (FOIA).²³⁸ The courts could conclude that OMB, COWPS, or RARG is an "agency" and therefore subject to the Act under the *Soucie v. David* test.²³⁹ In that case, the District of Columbia Circuit held that the President's Office of Science and Technology was an "agency," and not merely part of the President's staff, because it independently evaluated the scientific research programs of several federal agencies and published notices in the Federal Register.²⁴⁰

Even if OMB, for example, is an agency within the meaning of the Administrative Procedure Act, and hence FOIA, specific FOIA exemptions may prevent public disclosure of "Regulatory Analysis" documents. One exemption prevents disclosure of "inter-agency or intra-agency memoranda or letters which would not be available by law to a party other than an agency in litigation with the agency."²⁴¹ This exemption protects internal communication reflecting deliberative or policymaking processes, but not purely factual material. Agency cost-benefit analyses, background documents, and related OMB, COWPS, and RARG evaluations may fall within this exemption.²⁴²

Congress and the public may find other means of gaining access to Regulatory Analysis materials. Administrative Procedure Act provisions restricting an agency's right to take "official notice" of matters outside the decisionmaking record²⁴³ and prohibiting ex parte communication during formal rulemaking and adjudicatory proceedings²⁴⁴ may force disclosure of some documents. Furthermore, new legislation could require greater openness in presidential management of federal regulation through the Regulatory Analysis device.²⁴⁵ An example of this kind of congressional intervention is the Congressional Budget and

238. 5 U.S.C. § 552 (1976).

239. 448 F.2d 1067 (D.C. Cir. 1971).

240. *Id.* at 1075. These are among the major distinguishing characteristics of OSTP considered by the court. During consideration of the executive reorganization plan creating OSTP, its status was specifically likened to that of the Budget Bureau, the predecessor of OMB. *Id.* at 1074.

241. 5 U.S.C. § 552(b)(5) (1976).

242. The Sunshine Act, 5 U.S.C.A. § 552b (West 1977), presents similar issues concerning publicly held deliberative meetings, availability of transcripts, and judicial review. See Administrative Conference of the United States, *An Interpretive Guide to the Government in the Sunshine Act* (1978). RARG meetings are closed to the public.

243. 5 U.S.C. § 556(e) (1976).

244. *Id.* § 557(d)(1)(C) (1976). See note 203 *supra*.

245. See S. 262, 96th Cong., 1st Sess. (1979), which provides for agency publication of and public comment on initial regulatory analyses, as well as publication of final regulatory

Impoundment Control Act of 1974,²⁴⁶ which restricted the President's right to impound funds and thereby curtail the scope of programs authorized by Congress. Similarly, Congress might not tolerate the modification of legislatively mandated regulatory programs through RARG's or OMB's imposition of additional nonstatutory criteria relating to inflationary impact and other "costs" of regulation.²⁴⁷

Finally, Executive Order 12044 requires agencies to publish proposed regulations for implementing the Order in the Federal Register and to give the public an early and meaningful opportunity to participate in the development of subsequent agency regulations.²⁴⁸ The Order, however, permits each agency flexibility in choosing the most effective method for increasing public participation.²⁴⁹ To transform these vague directives into meaningful public participation, OMB and RARG should review agency practice and formulate more detailed guidelines. In addition, agencies should take independent steps to open their activities to timely public review under Executive Order 12044.²⁵⁰

D. Timing of Cost-Benefit Analysis in Decisionmaking

Agencies frequently conduct cost-benefit analysis after making regulatory decisions on other grounds. Agencies can take administrative action subject to NEPA only after publishing the final EIS, which may include cost-benefit analysis, and allowing a suitable time period for public comment. Cost-benefit analysis under enabling statutes or other authority, however, generally is not subject to similar timing provisions. Analysts at several agencies believe that their agencies often

analyses. Regulatory analysis itself, however, is excluded from judicial review. See note 208 *supra*.

246. Pub. L. No. 93-344, 88 Stat. 332 (codified at 31 U.S.C. §§ 1400-1407 (1976)).

247. See text accompanying notes 177-83 *supra*.

248. 3 C.F.R. 153 (1978 Compilation). The order requires publishing an advance notice of proposed rulemaking, holding open conferences or public meetings, and providing the public at least 60 days to comment on proposed significant regulations. *Id.* In giving notice of proposed rules, each agency is directed to inform the public on how to obtain any draft regulatory analyses that may have been developed. *Id.* at 155.

249. *Id.* at 153.

250. Under Executive Order 12044, agencies now publish proposed and final regulations and issue regulatory reform agendas providing general assurances as to the timely availability of regulatory analyses and public participation. See, e.g., 43 Fed. Reg. 47,005 (1978). Furthermore, published guidelines from OMB to the agencies and from CEA to RARG, require filing regulatory analyses for public availability and prior notice of public availability of draft regulatory analyses when the proposed rule is published in the Federal Register.

These general assurances, however, are ineffective in practice. For example, CPSC's final standard for power lawn mowers, 44 Fed. Reg. 9990 (1979), mentions the balancing that CPSC conducted between the need to reduce risks and possible adverse economic effects, but refers the reader to a Battelle Institute analysis of the economic costs, not included in the Federal Register entry. The Battelle report is an ad hoc analysis. Such references to ad hoc economic analyses, without provision of generic guidelines and justifications for the arbitrary elements of such analyses, do not adequately inform interested parties.

use cost-benefit analysis to "document" decisions already reached.²⁵¹ Such post hoc uses of cost-benefit analysis raise questions about the good faith objectivity of agencies in reaching regulatory decisions.

The timing of cost-benefit analysis often determines whether the technique is confined to its proper role in the decisionmaking process. In dealing with a regulatory problem involving technical uncertainty, risks, and control options based on scanty information, agencies normally undertake three tasks: (1) measurement of the risk; (2) identification of control options; and (3) determination of the level of risk acceptable to affected interests. The first and second tasks are primarily objective determinations that should not be "contaminated" by the technical expert's assumptions about the proper level of costs to impose on a regulated industry or the proper distribution of costs across different sectors of society. The third task, on the other hand, involves consideration of legal, economic, and social factors tradeoffs. Subjective valuation of costs and benefits through cost-benefit analysis may be appropriate here because the third task is carried out in the "sunshine," as required by administrative law. Agencies frequently fail to keep these functions distinct, polluting technical objectivity with unarticulated cost and other nontechnical factors. New regulatory procedures could prevent confusion of these functions by prohibiting the use of cost-benefit analyses until after technical measurement of risks and identification of control options have taken place.²⁵²

VI

CONCLUSION

Three broad conclusions can be drawn from this study. First, cost-benefit analysis is an inappropriate tool for regulatory decisionmaking on health, safety, and environmental problems. It should be replaced by the judicious use of cost-effectiveness analysis. Second, if cost-benefit analysis is to be used, and indeed increasingly used because of Executive pressures, several constitutional and public policy issues should be aired in order to ensure that the public and Congress approve of the transformation of regulatory decisionmaking from judgmental and qualitative balancing to economic and monetized balancing. Third, if neither the first nor second conclusion and the concerns they reflect are

251. Conclusion based on interviews with NRC, EPA, ERDA, and FEA staffs in Washington, D.C. (Fall 1978), in preparation of the Brookhaven Report, note 17 *supra*.

252. Timing alone does not determine the weight of cost-benefit analysis in the decision-making process. When several different regulatory alternatives have favorable benefit-to-cost ratios, the agency must decide whether to follow the most favorable course of action. For example, NRC may select any site with a favorable cost-benefit ratio as long as no "obviously superior site" exists. *In re Public Serv. Co.*, 5 NRC 503, 527-30 (1979). As a practical matter, NRC's use of cost-benefit analysis enables it to affirm the licensee's proposed site in virtually every case.

likely to be acted upon, society will have to "make do" with a set of incremental reforms in congressional, executive, and agency procedures.

A. Cost-Benefit Analysis v. Cost-Effectiveness Analysis

Cost-benefit analysis is an unacceptable basis for governmental decisionmaking on persistent health, safety, and environmental problems. It is a simplistic tool that reduces concern for the individual to a monetized balancing. Worse, it has become a self-serving numbers game obscuring arbitrary and subjective values and assumptions, while impeding real progress toward our espoused health, safety, and environmental objectives.

Solutions to societal problems, such as nuclear reactor safety and human exposure to chemical carcinogens, require consideration of humanistic and environmental principles. Consideration of these principles is incompatible with a regulatory decisionmaking process in which economic factors play a dominant role.

At present, the Clean Air and Clean Water Acts promote health and welfare considerations over industrial costs in setting standards and requiring regulatory decisions to be based on the "best available technology." By acknowledging that these principles are primary in most health, safety, and environmental areas, regulatory agencies could (1) establish health and safety goals on the basis of objective estimates and acceptable levels of risk arrived at in open proceedings; (2) identify the best available methods for achieving these goals; and (3) choose among alternative methods of achieving these objectives through cost-effectiveness analysis, the traditional analytical method of finding the least costly path to a goal.

This approach confines economic concerns to their proper role as one of several criteria for choosing a method for solving a societal problem. Cost-effectiveness analysis helps to determine the means, in contrast to cost-benefit analysis, which uses a quantitative approach to determine both the ends and means. Most significantly, the executive branch and agencies can adopt the cost-effectiveness alternative under most existing statutory schemes.

B. Constitutional and Ethical Issues

The use of cost-benefit analysis in the regulatory decisionmaking process also presents issues that transcend administrative law and procedure. For example, maintenance of the proper separation of powers in light of the ambitious regulatory reforms proposed by the Office of the President raises a significant constitutional issue. If the balancing function, now delegated to the agencies, is conducted by the Office of

the President, off the record and insulated from judicial review, power shifts from Congress to the Executive. This and other constitutional issues, which are beyond the scope of this Article, require vigorous discussion.

The use of cost-benefit analysis also raises important questions of professional ethics and responsibility for the economists and other analysts involved. It is irresponsible for such analysts to make arbitrary assumptions on issues which lie beyond their or anyone else's expertise. Decisions on the valuation of human life or environmental quality, the discount rate, and distribution of costs and benefits across society, are not properly dealt with by unaccountable analysts, but should be made by those vested with the responsibility to make these subjective choices. Congress and other publicly accountable officials must make these critical choices if cost-benefit analysis is to be employed responsibly.

The use of cost-benefit analysis also raises larger ethical questions. Our constitutional framework for governmental decisionmaking involves balancing many factors. It does not mandate the use of an economic framework, and indeed establishes a framework for decisionmaking which ensures that no single factor such as economics will dominate. The varied and often conflicting needs and desires of many segments of our society must be weighed against fundamental individual rights in order to establish ultimate societal values and reach an optimal governmental choice. This process is subverted when cost-benefit analysis is the basis of decisionmaking. An economic framework for making societal choices stresses only factors that are monetizable over a short period of time. Therefore, the use of cost-benefit analysis to determine our policies on such issues as radioactive waste disposal or access for the handicapped to public transportation systems inevitably leads to different results than those obtained by an analysis emphasizing long-term needs or individual welfare.

Public recognition of the ethical implications of governmental adoption of an economic framework for decisionmaking has been woefully insufficient. Responsibility for articulating public values lies with Congress. In light of the critical long-term consequences of cost-benefit analysis decisionmaking, meaningful and decisive congressional action is a necessity.

C. Reforming Present Cost-Benefit Analysis Practices to Promote Accountability

Rejection of cost-benefit analysis as a primary basis for regulatory decisionmaking and recognition of its functional, constitutional, and ethical limitations must occur eventually. Our political institutions, however, may not be ready to take these steps. Until meaningful change in the structural framework for decisionmaking occurs, some

pragmatic, if limited steps can now be taken to promote greater accountability and reduce critical problems presented by agency uses of cost-benefit analysis.

When properly applied, cost-benefit analysis can be a useful tool in the regulatory decisionmaking process. When used objectively, in good faith, and with requisite analytical rigor, cost-benefit analysis provides a framework for the rational organization of multiple considerations. Determinations made from properly organized opinions and information can represent a logical process, which in turn promotes agency credibility and acceptance of agency decisions. Furthermore, cost-benefit analysis promotes the use of a consistent and predictable analytical structure for organizing data and opinions on the numerous issues involved in a proposed regulatory action. Clear articulation of each element of the decisionmaking process enhances fairness and increases agency accountability. Cost-benefit analysis also offers decisionmakers a simple method for reaching decisions in the multiobjective, pluralistic value context in which most agencies operate. Despite its potential values, however, actual cost-benefit analysis practices demonstrate significant methodological, substantive, and institutional limitations. Methodological problems, including valuation of attributes, choice of discount rates, and distribution of effects, have always beset cost-benefit analysis. The substantive issues stem, in part, from the methodological limitations. Monetization of environmental and health amenities constitutes an inappropriate treatment of factors that transcend economics. Moreover, cost-benefit analysis often is insensitive to specific distributional implications of alternative decisions, thereby conflicting with constitutional concepts of equal protection. Critical elements of cost-benefit decisionmaking, such as the selection of data on measurements of risks and benefits, the development and application of discount rates, and the choice of analytical methods to read the data, are subjectively based determinations. The source of the data is often the clearly self-interested company or technocrat. These subjective determinations must be publicly tested and openly verified before their adoption in cost-benefit analysis.

Agency use of cost-benefit analysis also raises a number of major institutional issues. Agencies such as NRC and EPA have failed to coordinate analytical approaches to shared problems, such as radiation, and to adopt common values for health effects and environmental attributes. Nor have EIS and regulatory analyses been coordinated. CEQ has been silent on how agencies should conduct NEPA balancing analyses while COWPS and OMB have played increasingly significant but undefined roles in regulatory decisionmaking. Practical difficulties make meaningful public participation and timely access to information and deliberative meetings a problem. Furthermore, the timing of a

cost-benefit analysis often determines its actual influence on decision-making: if done late in the game, it may do no more than provide a post hoc rationale for a decision reached on other grounds.

Appropriate use of cost-benefit analysis in decisionmaking lies at the heart of new regulatory programs for protecting health, safety, and environmental quality. This is because each agency usually must reconcile multiple, frequently conflicting, statutory objectives and must follow specific statutory and Presidential requirements to conduct economic analyses. The increasing use of cost-benefit analysis reflects the administrative response to this growing need for a balancing or tradeoff process as the analytical foundation for agency decisions.

Given the conflicting demands of the escalating public outcry to render administrative agencies more accountable, statutorily or presidentially mandated balancing analyses, and the inherent problems presented by cost-benefit analysis, Congress, the Executive, and the agencies each must take steps to promote more responsible use of cost-benefit analysis in regulatory decisionmaking. The intent of the reforms discussed below is neither to foster nor exclude the use of cost-benefit analysis and other balancing analyses, nor to provide guidance as to when cost-benefit analysis should be used. Their purpose is to ensure that (1) cost-benefit analysis be responsibly employed whenever it is used, and that (2) the proposed reforms are implemented whenever regulatory agency balancing analyses are mandated.

1. Strategies for Congressional Reforms

Congress should conduct a comprehensive review of agency implementation of major health, safety, and environmental legislation to determine the extent to which agency uses of cost-benefit analysis or other balancing techniques are consistent with statutory objectives and sound administrative practice. The review should also identify conflicts between Executive Order 12044 as implemented and statutory requirements that prevent the agencies from acting consistently with congressional objectives.

Congress should also conduct a special review of agency implementation of NEPA's requirements for "balancing analysis" and other methodological requirements of section 102(2). Congress should then provide clearer guidance to the agencies by amending NEPA to achieve the following:

- Clarification of NEPA's applicability to agency rulemaking;
- Coordination of NEPA implementation procedures with the procedural requirements of Executive Order 12044;
- Clarification of the extent to which NEPA's impact assessment mandate requires quantification of the elements of a subsequent balancing analysis, the methodology for such quantification, and the

discount rate to be used for estimating the future impacts of agency action subject to NEPA; and

- Clarification as to whether agencies are required by NEPA to choose the best alternative resulting from the balancing analysis.

Congress, in future health, safety, and environmental legislation, should articulate more precisely the factors that federal agencies should consider in reaching decisions and furnish the “intelligible principles” necessary for agencies to meet the multiple objectives required by such legislation. Congress should state expressly when an agency should and should not use a cost-benefit approach and provide guidance as to how it is to be meaningfully integrated with Executive Order 12044 requirements. If Congress decides to promote a cost-benefit or other balancing analysis approach to regulatory decisionmaking, it should oversee the critical methodological issues such as valuation of intangible costs and benefits, use of discount rates, and distribution of effects.

Whether Congress provides guidelines on each of these issues or delegates that authority with guidance to an appropriate interagency body for resolution, the essentially nontechnical, subjective nature of these methodological issues must be recognized.

2. Strategies for Reforms in the Office of the President

The Office of the President should issue an Executive order amending Executive Order 12044 to provide further guidance to RARG, COWPS, OMB, and CEA in order to ensure that they implement Executive Order 12044 consistently with legislative requirements on health, safety, and environmental quality. The amended Order should enlarge the membership of RARG to include agency and non-governmental personnel representing the legally protected health, safety, and environmental interests at stake in the Regulatory Analysis process. The new Order should require RARG and the other Presidential offices to function in open proceedings, provide full public access to the information they use, and, in conjunction with the agencies under review, follow all requirements of the Administrative Procedure Act. Furthermore, the Order should provide that all RARG proceedings and materials germane to any agency’s final regulatory action be incorporated in the agency record of decision, available for public, congressional and judicial review.

Finally, the Order should direct RARG to make public findings on several key considerations in its review of any proposed agency action under Executive Order 12044:

- Authority for agency use of cost-benefit analysis or other balancing analyses;
- Particular methods of analysis selected by RARG or the agency, and attributes of such methods that conflict with governing legislation;

- RARG and agency methods for considering unquantifiable elements of the analyses, discounting future costs and benefits, evaluating distributional considerations, and other methodological problems;
- Timing of cost-benefit or other analysis vis-a-vis actual agency decisionmaking;
- Weight accorded to cost-benefit or other analysis in actual agency decisionmaking;
- Due process and Administrative Procedure Act safeguards developed by agencies in cost-benefit or other balancing analysis proceedings, including articulation of procedures through regulations, public notices, opportunities for affected interests to contest agency and RARG analyses before agency action, and restrictions on ex parte communications; and
- Public participation in agency cost-benefit analysis or other analyses and opportunity for review.

3. *Strategies for Reforms in All Regulatory Agencies*

Each regulatory agency using cost-benefit or other balancing analyses in making decisions should promulgate a generic regulation describing its use of these analytical tools in order to promote clear and consistent regulatory policy furthering the legislative and executive requirements under which the agency operates. The regulation should address the sources of agency authority to conduct balancing analyses, the particular analytical method selected by the agency and any conflicts with the applicable governing legislation, methodological limitations of the selected analytical approach and how they are addressed, the timing and weight afforded the analyses, due process safeguards, and public participation and opportunity for review.²⁵³

253. The author included these suggestions in a report to the Administrative Conference of the United States (ACUS), note 135 *supra*, which formed the basis of this Article. The ACUS adopted a recommendation based in part on this report for improvement of agency cost-benefit practices at its semi-annual plenary session in June 1979. See 44 Fed. Reg. 38,817-26 (1979) (to be codified in 1 C.F.R. pt. 305):

§ 305.79-4 Public disclosure concerning the use of cost-benefit and similar analyses in regulation (recommendation No. 79-4).

(a) Federal agencies must frequently weigh competing health, safety, resource management, environmental, economic, and other societal interests when seeking to achieve a prescribed statutory objective. Wise decisionmaking presupposes that the potential benefits and costs of the actions under consideration will be identified, will be quantified if feasible, and will be appraised in relation to each other. To give structure to the exercise of this responsibility, agencies sometimes use "cost-benefit" or similar analytic approaches to organize available information to determine the consequences of possible courses of action in terms of their costs, risks and benefits. Such techniques seek to display the projected net effects of alternative courses of action and, when properly used, can assist the decisionmaker in deciding which of the alternatives is most likely to produce a desired result.

(b) The following recommendation seeks to promote openness in the decision-making process, to ensure that agencies' analytic methods are sound and that their assumptions are known, so as to enhance public confidence in the soundness of conclusions finally reached. The recommendation is not intended to promote or to discourage the use of any single kind of analysis as a framework for agency

In addition, for decisionmaking conducted pursuant to the promulgated regulation, each agency should:

- At the time of public notice of proposed rulemaking or the initiation of licensing or other regulatory proceedings, make publicly available its preliminary findings on such key considerations relating to the intended regulatory action and describe fully any actual balancing conducted; and
- At the time of final regulatory action, and thereafter, include in the decision record any revised findings on these key considerations.

The public must be fully informed about the information and assump-

decision-making, since this choice is normally a matter of agency discretion. The choice of analytic technique may depend on several factors, including the technical complexity of the problem, the magnitude of the impacts, the time frame for agency action, and the extent to which quantification is possible for the specific costs and benefits to be considered. Any analysis, of course, should be viewed as an aid to rational decision-making, and not as an end in itself. The intent of the recommendation will be served by giving the public adequate advance notice of the agency's proposed methodologies, either generically or by means of special notice in a particular proceeding.

Recommendation

1. Agencies, as general policy though not necessarily by binding rule should adopt the practice of addressing, in their public notices of particular proceedings in which cost-benefit or similar analyses are to be used, the following points:
 - a. Any statutory or other legal requirements pertaining to or affecting the agency's conduct of cost-benefit or similar analyses in the proceeding.
 - b. The particular analytic technique to be followed by the agency (e.g., cost-benefit analysis, cost-effectiveness analysis, qualitative or non-numerative balancing), with a description of the method, including an identification of any analytic models preliminarily determined to be used.
 - c. Any factual assumptions or preliminary findings of the agency to be utilized in the analyses.
 - d. The agency's techniques for assessing and revealing uncertainties in its quantitative estimates, and making explicit the range of error associated with particular quantitative estimates.
 - e. The agency's methods for evaluating intangible costs and benefits, for discounting future costs and benefits, and for taking account of distributional effects arising under the selected methodology, to the extent such issues are involved in the analyses.
 - f. The stages of the proceeding at which the cost-benefit or similar analyses will be conducted and the results considered.
 - g. The extent and nature of public participation in the design, conduct, and evaluation of the cost-benefit or similar analyses.
 - h. The extent and manner in which the public is to be accorded access to assumptions and information used in the analyses.

A statement of the weight given the cost-benefit or similar analyses, and a description of any revisions of assumptions or preliminary findings, should be included in the final agency determination and made available to the public.

2. Where a pattern of recurring decisional problems exists for which a particular analytic technique is appropriate, the agency should consider adopting a generic regulation or policy statement describing the use of that technique with respect to those problems. Agencies that have varied statutory functions may suitably formulate separate regulations or policy statements for different areas of statutory responsibility. Generic regulations or policy statements so adopted may permit the use of different techniques on an ad hoc basis where the agency determines that to be necessary. Any such regulations or policy statements should address the points listed in paragraph 1.

tions that form the basis of agency action, their sources, and reasons for departing from the provisions of the generic regulation.

D. A Final Perspective

The cost-benefit techniques used today are the analytical descendants of Jeremy Bentham's proposals for reforming legal decisionmaking through the use of "felicific calculus."²⁵⁴ Much of the philosophical and humanistic criticism of the Bentham approach remains valid today and is reinforced by constitutional principles that reflect a more holistic approach to governance in a pluralistic society and limit the uses of economic analysis in decisionmaking. In essence, the Constitution does not require that governmental decisionmaking be premised on simplistic economic analyses.

Nevertheless, a strong argument can be made that providing the greatest good for the greatest number remains one of the essential purposes of government, and that cost-benefit analysis represents a potentially workable method to reach this objective. The Executive and its agencies have the responsibility to manage the federal enterprise rationally in order to achieve optimal use of our limited resources and optimal protection of our diverse interests. If cost-benefit analysis continues as a basis for regulatory agency decisionmaking, it must be accompanied by meaningful public participation, diligent congressional, executive, and judicial supervision, and agency "best efforts" to structure their discretion to meet the issues presented by this economic approach to the problems of health, safety, and environmental protection.

254. See generally BENTHAM'S POLITICAL THOUGHT (B. Parekh ed. 1973). See in particular ch. 5, "Of the Principle of Utility."

