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Integrating Thoughtways: Re-Opening of the Environmental Mind?

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ARTICLES

INTEGRATING THOUGHTWAYS: RE-OPENING OF THE ENVIRONMENTAL MIND?

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The implementation of environmental law and policy has assumed that pollution could be contained, corralled and interdicted within the medium (air, land, or water) in which unpleasant effects are encountered. Sweeping, but piecemeal, federal legislation in the 1970s aspired to create healthy air, together with fishable, swimmable and drinkable waters. Despite impressive gains, these goals have not been achieved. There have been painful failures, compounded by the mounting costs of environmental protection. While the need for environmental protection is generally accepted, the effectiveness and efficiency of regulation based on the legislation of the 1970s has been questioned in the 1980s.

This Article argues that the twin goals of efficiency and effectiveness could be satisfied by adopting an integrated approach to pollution control. It is fundamental to such an approach that the effects of pollution should be pursued to their sources, and that air, land and water be considered as one environment rather than as separate and discrete parts. Professor Guruswamy develops his argument by tracing the legislative history of two epochal environmental events: the enactment of the Clean Air and Clean Water Acts of the 1970s and the establishment of the Environmental Protection Agency (EPA). He points out how the integrative thrust behind the EPA floundered amidst a climate of opinion hostile to New Deal expertise, legislative turf battles and administrative jealousies. Maintaining that integration is an idea whose time has come, Professor Guruswamy nevertheless contends that new comprehensive environmental legislation will face insuperable obstacles. Arguing for an administrative solution, he relies on evolving concepts of environmental policy, and comparative examples abroad, to recall EPA to its original mandate of integration. Finally, Professor Guruswamy analyzes the Toxic Substances Control Act (TSCA) to demonstrate the considerable extent to which an integrated approach, based on TSCA, could be implemented by the EPA.

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THE HYDRA-HEADED OGRE

This is a fable[1] *about the hydra-headed ogre of pollution (the Hydra). Having found its way into the United States, it*

1. This allegory is derived from sources cited throughout the Article. In the United States, the main thrust towards a cross-media approach to pollution control has come from the Conservation Foundation. *See* CONSERVATION FOUNDATION, CONTROLLING CROSS-MEDIA POLLUTANTS (1984) [hereinafter CROSS-MEDIA POLLUTANTS]; CONSERVATION FOUNDATION, NEW PERSPECTIVES ON POLLUTION CONTROL: CROSS-MEDIA PROBLEMS (1985); CONSERVATION FOUNDATION, STATE OF THE ENVIRONMENT: AN ASSESSMENT AT MID-DECADE (1984) [hereinafter NEW PERSPECTIVES]; B. RABE, FRAGMENTATION AND INTEGRATION IN STATE ENVIRONMENTAL MANAGEMENT (1986). The National Research Council and National Academy of Public Administration, after studying the subject have lent their weighty support to the adoption of an integrated approach to pollution control. *See* NATIONAL RESEARCH COUNCIL, MULTIMEDIA APPROACHES TO POLLUTION CONTROL: A SYMPOSIUM PROCEEDINGS (1987); NATIONAL ACADEMY OF PUBLIC ADMINISTRATION, STEPS TOWARD A STABLE FUTURE (1986). In the United Kingdom, the Royal Commission on Environmental Pollution (RCEP) has taken the lead in advocating an integrated approach. *See* ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION, BEST PRACTICABLE ENVIRONMENTAL OPTION (Rep.

began its predations about the middle of the twentieth century. It did so invisibly, often deviously, so that most people did not realize what it was doing and, therefore, did little to stop it.[2] *Left virtually unmolested for nearly two decades, it grew worse, feasting on the surrounding environment and people. The Hydra became quite bold in its attacks in the air, water and land, showing different heads at different places.*[3] *The people felt threatened and called on Congress and the President for help. They were given laws dealing with air pollution,*[4] *water pollution*[5] *and*

No. 12, 1988) [hereinafter RCEP, No. 12]; ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION, MANAGING WASTE: THE DUTY OF CARE (Rep. No. 11, 1985) [hereinafter RCEP, No. 11]; ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION, TACKLING POLLUTION-EXPERIENCES AND PROSPECTS (Rep. No. 10, 1984) [hereinafter RCEP, No. 10]; ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION, AIR POLLUTION CONTROL: AN INTEGRATED APPROACH (Rep. No. 5, 1976) [hereinafter RCEP, No. 5]. *See also* ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, STATE OF THE ENVIRONMENT (1985). Two further publications—DEPARTMENT OF THE ENVIRONMENT (UNITED KINGDOM), INTEGRATED POLLUTION CONTROL (1988) and CONSERVATION FOUNDATION, THE ENVIRONMENTAL PROTECTION ACT (Second Draft, 1988)—have arrived too late to be considered except in a very impressionistic manner.

2. Prior to 1948, there was little federal legislation dealing with environmental pollution. Environmental control was traditionally viewed as protecting the health, safety and welfare of the people and, therefore, was a function of the states under their police powers. F. GRAD, G. RATHJENS & A. ROSENTHAL, ENVIRONMENTAL CONTROL: POLICIES AND THE LAW 49 (1971); R. MELNICK, REGULATION AND THE COURTS: THE CASE OF THE CLEAN AIR ACT 25 (1983). There were exceptions, such as the Rivers and Harbors Appropriation Act of 1899, but they were rarely applied until the Environmental Protection Agency (EPA) rediscovered them in 1971. *See infra* note 5.

3. In the early 1960s, there were shocking reports about pollution headlined in *Redbook*, *Sports Illustrated* and *Life Magazine*. For example, thousands of fish killed in the Passaic River in 1960; a temperature inversion (an unusual meteorological occurrence in which a layer of warmer air overlies a heavier, cooler layer that holds down pollution) in New York in 1966 that resulted in 80 deaths; and the oil spills on the York River, Cape Cod and Wake Island in 1967. The history of such incidents is recounted in J. PETULA, ENVIRONMENTAL PROTECTION IN THE UNITED STATES 39-61 (1987).

4. The Clean Air Act, Pub. L. No. 88-206, 77 Stat. 392 (1963); Motor Vehicle Air Pollution Control Act, Pub. L. No. 89-272, 79 Stat. 992 (1965); Air Quality Act of 1967, Pub. L. No. 90-148, 81 Stat. 485 (1967). The agency responsible for implementation was the National Air Pollution Control Administration in the Department of Health, Education and Welfare (HEW).

5. Water Pollution Control Act, Pub. L. No. 80-845, 62 Stat. 1155 (1948); Water Quality Act of 1965, Pub. L. No. 89-234, 79 Stat. 903 (1965); Clean Water Restoration Act of 1966, Pub. L. No. 89-753, 80 Stat. 1246 (1966); Water Quality Improvement Act of 1970, Pub. L. No. 91-224, 84 Stat. 91 (1970). The 1965 act created the Federal Water Pollution Control Administration within the Department of the Interior; this agency was to oversee the adoption and implementation of water quality standards. *See* Hines, *Nor Any Drop To Drink: Public Regulation of Water Quality*, 52 IOWA L. REV. 186 (1966); Barry, *The Evolution of the Enforcement Provisions of the Federal Water Quality Control Act: A Study of the Difficulty in Developing Effective Legislation*, 68 MICH. L. REV. 1103 (1970). At the same time, section 13 of the Rivers and Harbors Appropriation Act, 30 Stat. 1152 (1899), was revived to prevent the discharge of polluting wastes. The history of how this act was developed is recounted in 2 W. RODGERS, ENVIRONMENTAL LAW AIR AND WATER 162-80 (1986).

solid waste pollution.[6] *In addition, corresponding agencies were provided to fight the ogre. The laws and agencies proved to be no match for the Hydra.*[7] *It continued to feast on the environment and people, expanding to fiendish proportions. Then, having grown so powerful, and too massive to remain hidden, it spurned its hiding places and openly terrorized the people on land and in the air and water.*[8]

The people had, by now, become truly terrified. They poured out into the streets and packed meetings on Earth Day, imploring Congress and the President to end the tyranny.[9] *Public outrage at the extent of pollution resulted in incessant calls for action against the Hydra.*[10] *The nation had become engaged in a crusade.*[11]

The crusade, however, was conducted in disunity. Disunity was manifested between the President and Congress, within congressional subcommittees, and between the President and

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6. Solid Waste Disposal Act, Pub. L. No. 89-272, 79 Stat. 997 (1965). This act authorized research and grant programs, and led to the creation of the Bureau of Solid Waste Management in HEW. The Resource Recovery Act of 1970, Pub. L. No. 91-512, 84 Stat. 1227 (1970), amended the Solid Waste Disposal Act.

7. W. RODGERS, HANDBOOK ON ENVIRONMENTAL LAW 210-11 (1977); Schoenbrod, *Goals Statutes or Rules Statutes: The Case of the Clean Air Act*, 30 UCLA L. REV. 740, 744-45 (1983). *See also* R. MELNICK, *supra* note 2, at 28; R. TOBIN, THE SOCIAL GAMBLE: DETERMINING ACCEPTABLE LEVELS OF AIR QUALITY 71-75 (1979); J. DAVIES & B. DAVIES, THE POLITICS OF POLLUTION 26-57 (1975).

8. In 1969, the Cuyahoga River burst into flames. In the same year, over 800 miles of ocean were despoiled by the Santa Barbara oil spill. The problem of smog in Los Angeles increased dramatically. The water supply of many midwestern cities was found to be polluted with excessive nitrates. It was feared that Lake Erie was dying. *See* B. COMMONER, THE CLOSING CIRCLE 1-111 (1971). In 1976, *Newsweek* implicated environmental pollutants as a cause of cancer. There were hundreds of reports in newspapers and on prime time television showing public outcries over environmental pollution in its various forms. In 1978, heavy media coverage was given to the devastating effect of chemicals seeping into homes around Love Canal in Niagara Falls, New York. An account of these events is found in J. PETULA, *supra* note 3, at 57-61.

9. Earth Day was held on April 22, 1970, and millions participated. The *New York Times* proclaimed: "Millions Join Earth Day Observances across the Nation." N.Y. Times, Apr. 23, 1970, at 1, col. 3. Astonished accounts of the extent and feeling of the meetings and demonstrations were reported in all the media. For a summary of the nationwide reporting of these activities and their impact, even on conservative politicians and observers, see J. WHITAKER, STRIKING A BALANCE 2-16 (1976).

10. ADVISORY COMMISSION ON INTERGOVERNMENTAL RELATIONS, PROTECTING THE ENVIRONMENT: POLITICS, POLLUTION AND FEDERAL POLICY 18 (1981) [hereinafter ACIR, PROTECTING THE ENVIRONMENT]; *see also* Erskine, *The Polls: Pollution and Its Cost*, 36 PUB. OPINION Q. 120 (1972) (noting the remarkable speed with which environmental consciousness sprang, as it were, from "nowhere" to major proportions in a few years). Jaffe, *The Administrative Agency and Environmental Control*, 20 BUFFALO L. REV. 231, 233-34 (1970) ("Until recently there has been no organized pressure for environmental control. The political situation has changed radically. Every politician is now sounding the call for pure air and pure water. The legislative activity is tremendous."); R. MELNICK, *supra* note 2, at 28; C. JONES, CLEAN AIR 137-55 (1975).

11. Stewart, *Pyramids of Sacrifice? Problems of Federalism in Mandating State Implementation of National Environmental Policy*, 86 YALE L.J. 1196, 1217 (1977).

EPA.[12] *Moreover, the crusaders were unaware or uncertain about how to kill the Hydra. Those whom the air Hydra threatened were so concerned with air pollution damage that they overlooked the devastation the Hydra caused in the water or on the land. Accordingly, they focused on efforts to slay the air Hydra and were given new laws directed at destroying air pollution.*[13] *Others, who encountered the Hydra on water, found it so horrifying that they, too, developed tunnel vision and ignored what the Hydra was doing in the air or on the land. They demanded and were given new water pollution legislation.*[14] *Those who confronted the Hydra on land did likewise and were rewarded with new solid waste disposal laws.*[15]

At one stage, the President thought that a single, integrated agency should conduct a unified battle against the monster. He established the Great Agency for this purpose.[16] *The President and Congress also recognized the need for an integrated campaign against the Hydra by enacting laws dealing with national environmental policy*[17] *and toxic waste.*[18] *Unfortunately, these laws did not put an end to the disunity between the President and Congress. Furthermore, earlier laws had already divided the environment into sectors, and bureaucracies had become accustomed to acting only within defined programs and the confined jurisdictions of air, water, or land. These bureaucracies felt that the original mission of the Great Agency and the objectives found in integrating laws were impracticable, and integration was soon forgotten.*[19]

Alas, the attempt to deal with pollution within individual sectors was not altogether successful. As the saga unfolded, it became apparent that the felling of one head of the Hydra often resulted in the appearance of another. The proclaimed decapitation and "elimination" of a single head proved to be an illusion.

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12. R. MELNICK, *supra* note 2, at 31-35.

13. Clean Air Act Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (1970); Clean Air Act Amendments of 1977, Pub. L. No. 95-95, 91 Stat. 685 (1977).

14. Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816 (1972); Safe Drinking Water Act, Pub. L. No. 93-523, 88 Stat. 1660 (1974); Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1566 (1977).

15. Resource Conservation and Recovery Act of 1976, Pub. L. No. 94-580, 90 Stat. 2795 (1976); Hazardous and Solid Waste Amendments of 1984, Pub. L. No. 98-616, 98 Stat. 3221 (1984). Comprehensive Environmental Response, Compensation, and Liability Act of 1980, Pub. L. No. 96-510, 94 Stat. 2767 (1980).

16. Reorganization Plan No. 3 of 1970, 35 Fed. Reg. 15,623 (1970) [hereinafter Reorganization Plan].

17. National Environmental Policy Act of 1969, Pub. L. No. 91-190, 83 Stat. 852 (1970).

18. Toxic Substances Control Act, Pub. L. No. 94-469, 90 Stat. 2003 (1976).

19. *See infra* notes 116-47 and accompanying text.

Instead of being eliminated or neutralized (by chemical or physical processes that changed it into a non-pollutant), a pollutant was simply transferred from one medium to another. Pollution controllers failed to realize that each head (of pollution) arose from its source (the Hydra's body or wastes) and that the whole Hydra constituted the real enemy.

Pollution apparently dispelled from the air did some ominous things. Sometimes it appeared at different and distant places in a form more fierce than before.[20] *In other instances, pollution disappeared from the air only to alight on water*[21] *or, when interdicted in the air, materialized on land.*[22] *Similarly, pollution apparently expelled from water reemerged in the air or materialized on land.*[23] *When the Hydra was prohibited from*

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20. When sulfur dioxide was sent away from one area, it combined with nitrogen oxides to cause acid deposition in another. *See* Martin, *Acid Rain From Source to Receptor*, 5 CANADA-U.S. L.J. 16 (1982); Snipes, *Acid Rain: Causes, Effects, and Remedies*, 3 STAN. ENVTL. L. ANN. 118 (1981); Kramer, *Transboundary Air Pollution and the Clean Air Act: An Historical Perspective*, 32 U. KAN. L. REV. 181 (1983); 1 NATIONAL ACID PRECIPITATION ASSESSMENT PROGRAM, INTERIM ASSESSMENT: THE CAUSES AND EFFECTS OF ACIDIC DEPOSITION (1987) (executive summary). Sulfur dioxide, which results from the combustion of coal, tends to settle out of the air close to the point from which it is emitted. To prevent this, tall stacks were built (usually with high velocities in them), and sulfur dioxide was emitted into the air from these stacks. It was hoped that sulfur dioxide would be removed from the point of origin, while the dispersive processes in the atmosphere would dilute it below the level of physiological significance. Unforescen was the extent to which it could combine with other pollutants to cause acid rain which affects vegetation and land, as well as water.

21. In the mid-1970s, the fish in Lake George, a popular recreational lake in New York, had accumulated dangerously high levels of mercury and polychlorinated biphenyls (PCBs). A significant, though not the sole, cause was deposition from the air. Similarly, deposition from the air is a major source of pollution in the Great Lakes. In fact, the single largest source of lead, zinc and copper pollution is not direct discharge into water, but atmospheric deposition. CROSS-MEDIA POLLUTANTS, *supra* note 1, at 1, 16-17; Elder, *Air Toxics: A Headache for the Great Lakes*, 14 EPA JOURNAL 37 (1988). Once again, the attempt to get rid of air pollution by discharging it into the air did not take account of the extent to which there was an interface between air and water pollution. What the atmosphere was unable to disperse came down on land or water.

22. For example, technologies used to comply with air pollution laws may produce from three to six tons of scrubber sludge for every ton of sulfur dioxide removed from flue gases. About four fifths of the 118 million tons of dry metric sludge produced annually is the direct result of air pollution controls mandated for industrial and power plants. CROSS-MEDIA POLLUTANTS, *supra* note 1, at 9. A preponderance of this sludge is deposited on land. Another example, from East Helena, Montana, is quite revealing. Cadmium was controlled by ambient air quality standards in order to prevent damage to human health caused by inhalation of cadmium. Experts found, however, that the perceived cause for concern and control (inhalation) was much less damaging than exposure through the consumption of locally grown food contaminated by air depositions of cadmium. The problem was that ambient air quality standards directed at inhalation did not cover food contaminated by the fall-out of cadmium. There was little appreciation of the total exposure of a person to cadmium through different pathways. *Id.* at 2.

23. A recent EPA study of what happened to toxic substances—which include organic pollutants (such as pesticide solvents, PCBs and dioxins), metals (such as mercury, cadmium, zinc and copper), and other compounds (such as asbestos and cyanide)—entering a sewage treatment plant shows that typically only about 50% of toxics are actually removed. Of the remainder, 20% go into air, 15% are deposited on land in the form of sewage sludge and 15% go back into the

entering the water, it sometimes took different and equally intimidating forms.[24] *The story repeated itself on land.*[25]

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1. INTRODUCTION

Modern industrial societies engage in a staggering range of domestic and industrial activities that make high demands on energy and raw materials. The matter and energy used in these activities are neither created nor destroyed, but instead merely transformed. Massive quantities of wastes or residuals are, therefore, the unavoidable by-products of today's living.[26] For example, the residuals generated by even an ordinary city bus include noise, heat, hydrocarbons, particulates and carbon monoxide. Residuals arise from the manufacture, processing and packaging of new products out of raw materials and natural resources undertaken at an iron or steel complex, a motor car plant, or an

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water, without treatment. These statistics enable one to understand how a municipal wastewater treatment plant in Philadelphia is the largest source of air pollution in that metropolitan area. Letter from J. Clarence Davies, Executive Vice-President of the Conservation Foundation, to Mr Hank Schilling, Office of Policy Planning and Evaluation of EPA, and Members of the Advisory Committee (March 13, 1987). This is not an illustration of the inadequacy of treatment works. It raises the more fundamental question of why these toxics were allowed to enter the sewer in the first place. Were the effects of these toxics on the entire environment assessed before the decision to discharge them into water? Although section 307 of the Clean Water Act, dealing with pre-treatment of affluent, goes some way towards recognizing the problem, this section does not offer a complete solution.

24. In one particular industrial plant, the removal of two tons of pollutants from its liquid effiuent generated 1.9 tons of other forms of pollutants. RCEP, No. 12, *supra* note 1, ¶ 3.10, at 15.

25. It has been well documented that leaching is a major means by which pollutants migrate from waste management sites on land into groundwater. V. PYE, R. PATRICK & J. QUARLES, GROUNDWATER CONTAMINATION IN THE UNITED STATES (1983); GEOPHYSICS RESEARCH FORUM, STUDIES IN GEOPHYSICS: GROUNDWATER CONTAMINATION (1984); U.S. ENVIRONMENTAL PROTECTION AGENCY, GROUND-WATER PROTECTION STRATEGY (1984); COUNCIL ON ENVIRONMENTAL QUALITY, CONTAMINATION OF GROUNDWATER BY TOXIC ORGANIC CHEMICALS (1981). Similarly, volatilization is a process by which pollutants in waste sites can find their way into the air. CROSS-MEDIA POLLUTANTS, *supra* note 1, at 15-16 (citing COMMITTEE TO REVIEW METHODS OF ECOTOXICOLOGY, NATIONAL RESEARCH COUNCIL, TESTING FOR EFFECTS OF CHEMICALS ON ECOSYSTEMS 1618 (1981)). Not surprisingly, a study of 27 out of 200 chemicals found in Love Canal (a notorious abandoned waste dump) showed that 18 of the 27 pollutants were found in air, water and soil. An assessment of case histories at a variety of other waste sites showed that 32% of the pollutants found affected groundwater, 31% soil, 29% surface water, and 8% air. CROSS-MEDIA POLLUTANTS, *supra* note 1, at 11. Once again, the question is whether the effects of disposal of wastes on land were considered.

26. A. KNEESE & B. BOWER, ENVIRONMENTAL QUALITY AND RESIDUALS MANAGEMENT 1-12 (1979); RABE, *supra* note 1, at 15 n.46; Kneese, *Pollution and a Better Environment*, 10 ARIZ. L. REV. 11 (1968); A. KNEESE, ECONOMICS AND THE ENVIRONMENT 16-73 (1977); M. HUFSCHMIDT, D. JAMES, A. MESITER, B. BOWER & J. DIXON, ENVIRONMENT, NATURAL SYSTEMS AND DEVELOPMENT 73-113 (1983); L. ORTOLANDO, ENVIRONMENTAL PLANNING AND DECISION MAKING 25-34 (1984); J. LOWE, D. LEWIS & M. ATKINS, TOTAL ENVIRONMENTAL CONTROL 3 (1982).

oil refinery. Residuals also arise when the finished products—whether cars, machinery, disposable razors, or waste oil—are discarded rather than re-used. Residuals may consist of either materials or energy. Material residuals take the form of gases (such as carbon monoxide, nitrogen dioxide and sulphur dioxide), particulates, dry solids (such as rubbish and scrap), and wet solids (such as garbage, sewage and industrial wastes suspended or dissolved in water). Energy residuals take the form of noise or waste heat; for example, waste heat is returned to the atmosphere when coal is burned to produce electricity.[27] So long as wastes and residuals are produced, they have to go somewhere and are, therefore, a potential source of pollution.

The aquatic, atmospheric and terrestrial environments are capable of performing tremendous scavenging, assimilating and dispersing functions. Every modern society has made the fundamental assumption that the environment can and should be used as a medium for disposing of wastes. When, however, the environment is incapable of coping with residuals, or its neutralizing capacity is overburdened, pollution occurs.[28] In general, pollution laws have not absolutely prohibited the disposal of such wastes in the environment. An absolute prohibition would be impossible without banning many of the activities on which Western society is dependent. What the laws have done, except in very special circumstances, is to control only the harmful effects of potentially polluting activities.[29] Under such laws, discharges of harmful residuals have been treated, processed, or redistributed in an effort to remove the undesirable substances or render them harmless.[30]

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27. A. KNEESE & B. BOWER, *supra* note 26, at 26.

28. U.S. COUNCIL ON ENVTL. QUALITY, ENVIRONMENTAL QUALITY, FIRST ANNUAL REPORT 6-11 (1970) [hereinafter FIRST ANNUAL REPORT]; AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, AIR CONSERVATION 23-39 (1965).

29. This is the underlying premise of almost all pollution control legislation. *See* W. RODGERS, *supra* note 7 at 2-4; F. GRAD, ENVIRONMENTAL LAW 4-6 (3d ed. 1985); R. STEWART & J. KRIER, ENVIRONMENTAL LAW AND POLICY 25-27 (2d ed. 1978). Even some of the most stringent pieces of legislation are not exceptions to this premise. For example, the cost-oblivious mandates of the Clean Air Act oblige EPA to set primary ambient air quality standards for criteria pollutants "allowing an adequate margin of safety." 42 U.S.C. § 7409(b)(1) (1982). The mandates of the Clean Water Act require industries to install "the best available technology economically achievable" by 1983. 33 U.S.C. § 1311(b)(2)(A) (1982). The Delaney Amendment to the federal Food, Drug and Cosmetics Act states that no cancer forming substances may be added to food. 21 U.S.C. § 348(c)(3)(a) (1982). These provisions do not constitute absolute prohibitions, but seek to exclude pollutants which cause harm, and only to the extent that they cause harm to human health.

There are some notable exceptions to the premise. For example, the goals of the Clean Water Act called for the elimination of discharges into navigable waters by 1985. Clean Water Act § 101(a)(1) & (2), 33 U.S.C. § 1251(a)(1) & (2) (1982). The prevention of significant deterioration (psd) provisions of the Clean Air Act which designated all national parks and wilderness areas as class one areas in order to protect these areas from significant deterioration in air quality, may also fall within the exceptions. 42 U.S.C. § 7472 (1982).

30. The attempt by the Clean Water Act to eliminate all discharges into navigable waters has been characterized as "impossible." W. RODGERS, *supra* note 5, at 19.

Unfortunately, the formidable, complicated web of law and policy controlling pollution in the United States, and in most European industrial countries, leads to a regrettable conclusion. Separate pollution control programs for air, water and land have been established without an adequate appreciation of the interrelated character of the three environmental sectors, a comprehension of the total burden of pollution, or a determination of which method of disposal would cause the least environmental damage overall. The result, in many situations, is that present pollution controls are ineffective and inefficient.[31] This conclusion is not based upon an economic cost-benefit analysis, which would require that the environment be used to its "optimal" level, but it is consistent with political decisions to protect fragile environments or even to protect the environment for its own sake, and is quite independent of individual preferences based upon dollar values.

This Article will explore the basis and rationale for the fragmentation of law and policy dealing with pollution, and make the case for a more integrated approach. In doing so, the Article will traverse the broader issues of administrative law, policy and politics surrounding integration. Part II will deal with the defects of fragmented controls, explaining why such controls are ineffective from an environmentalist standpoint while also being inefficient from an economic perspective. It will then review the reasons leading to the adoption of a fragmented approach to policy and law in the early 1970s. Part III attempts a preliminary exposition of a functional concept of integration. It then sharply distinguishes the integration advocated in this Article from deregulation and the changes urged by regulatory reformers. Part III concludes by examining how integrated policies are incorporated in the National Environmental Policy Act[32] and the Environmental Protection Agency.[33]

Part IV explores the way ahead and argues that the time has come for an integrated approach. A different configuration of ideas is taking place in the 1980s. A convergence of ecological thinking and administrative policies based on rationality seems to be evolving towards integration. Part IV examines the Draft Act on environmental integration proposed by the Conservation Foundation but concludes that the enactment of a new, integrated act is a near impossibility. It argues that

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31. A recent example from Britain is instructive. Air pollution controls in that country obliged a corporation to remove gaseous fluoride from a gas stream by wet scrubbing. The scrubbing liquor was discharged into water as a trade effluent and found its way into sewage sludge which was spread on grazing land. As a result, cattle fed on grass fertilized by that sludge developed fluorosis. In the view of the British Royal Commission on Environmental Pollution, "a minor air pollution problem had been converted to a serious land pollution problem." RCEP No. 12, *supra* note 1, ¶ 3.10, at 15.

32. National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321-4370a (1982).

33. Reorganization Plan, *supra* note 16.

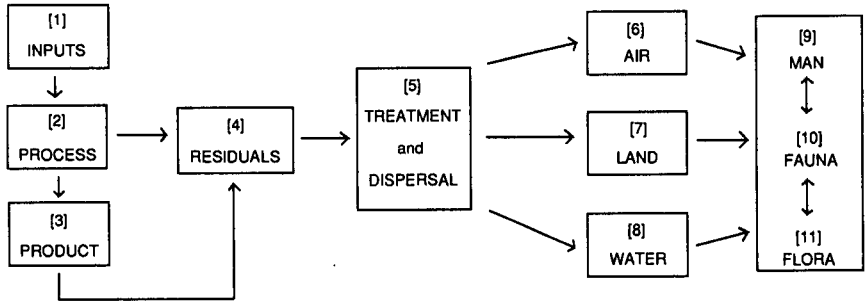
the tide of fragmentation could, however, be turned by the use of existing legislation and institutions. An analysis of the Toxic Substances Control Act of 1976 demonstrates how this can be done.

II. The Fragmented System

A. Defects of Fragmented Controls

A productive enterprise engaged in manufacturing, mining, logging, or agriculture employs capital equipment, together with human and non-human energy, to produce physical, chemical and biological reactions or changes in raw materials. The purpose of the endeavor is the creation of desired products or outputs. Residuals are the unavoidable corollary of such a productive activity. They vary according to the types of inputs of raw materials and energy used in the activity, such as coal, oil, or wood; the end products of the process, be they electricity, petroleum, steel, or toilet paper rolls; and the process employed (a combination of equipment and energy to create the desired products out of raw materials). Boxes 1, 2, and 3 of Diagram A illustrate this productive activity.

Diagram A



The present fragmentation of the environment by the law, policy and administration (the fragmented approach) fails to provide effective pollution controls for numerous reasons that Diagram A illustrates. First, the fragmented approach does not usually consider the part played by inputs in the creation of residuals. The relationship of inputs to residuals can be illustrated by the coal electric industry. In a coal-burning power plant, the combustion of coal to create electricity produces sulfur dioxide (SO_2), oxides of nitrogen (NO x), particulates, bottom ash, and other unwanted materials. The quantity of SO_2 generated in combustion is a function of the sulfur content of raw coal and the extent, if any, of its removal in coal processing or by washing. The ex-

tent to which the sulfur content of the coal (the input) determines the nature of the residuals has been vividly demonstrated.[34] The gains achieved by simple and inexpensive washing techniques used on high-sulfur coal, prior to its use in production, varied from twenty to forty percent, compared to less than fifty percent gained from employing billion-dollar scrubbers. Similarly, the burning of high quality natural gas releases even fewer harmful residues.[35]

Second, the fragmented approach generally does not hold the end product accountable for harmful residuals. Yet, the extent to which the final product influences the residuals discharged is considerable. For example, the production of a highly bright (bleached) white paper requires substantially greater quantities of chemicals, water and energy, resulting in the generation of larger amounts of residuals than an unbleached paper. One study found that the liquid residuals were reduced by eighty-five to ninety percent, while gaseous residuals were reduced by fifty percent, by producing unbleached paper.[36] The same argument applies to a wide variety of end products. Accordingly, certain environmental costs of the bewildering and often unnecessary products that are paraded on the market are often ignored.

Pollution laws, in general, concentrate on end-of-line controls and do not treat input and final products as part of the problem. When regulating end-of-line controls on industrial processes, pollution control laws have set separate standards for air, water and land. Controls applicable to each medium are applied and administered independently of each other. In so doing, congressional laws have ignored the overriding law of nature that "nothing goes away." A basic law of physics states that matter is indestructible.[37] This law dictates that the residuals from a production process cannot be destroyed. Their initial destination may be altered, but ultimately they re-enter the flow of materials within the environment. While limitations on discharges may correct the immediate environmental problem to which they are directed, these restrictions themselves often have impacts in other places. These impacts, known as cross-media or inter-media pollution transfers,[38] could happen either by direct transfers ("trade-offs") or by indirect transfers.

Direct transfers occur when control technologies aimed at achieving specific limits to pollution generate new streams of residuals which have adverse environmental effects on other media. Unfortunately, when limitations on discharges into one medium are imposed, those

34. Ackerman & Hassler, *Beyond the New Deal: Coal and the Clean Air Act*, 89 YALE L.J. 1466, 1481-82 (1980).

35. A. KNEESE & B. BOWER, *supra* note 26, at 44.

36. *Id.* at 64-75.

37. *See* sources cited *supra* note 26. *See also* B. COMMONER, *supra* note 8, at 39.

38. *See* sources cited *supra* note 1.

ordering the limitation sometimes give scant attention or consideration to the parallel impacts. The massive quantities of sludge created by existing pollution controls offer disturbing evidence of this problem. EPA has estimated that between three and six tons of scrubber sludge may be produced for each ton of sulphur dioxide removed from flue gases.[39] Consequently, the problem of sulphur dioxide in the air is replaced by one of sludge disposal. Municipal wastewater treatment and sewage treatment plants also produce large quantities of sludge. Some of this contains toxic substances[40] which are nondegradable and bioaccumulable. In all, it is estimated that over 118 million metric tons of sludge are produced annually.[41]

The troubling question is: Where does the sludge go? It could be spread or buried on land, incinerated, or dumped at sea. But all these solutions have attendant problems. If managed on land, there is a danger either of rain water run-off transferring heavy metal into water, or of organic chemicals leaching into surface and ground water.[42] While sewage sludge may fertilize agricultural land, this could result in heavy metals and organic chemicals being absorbed by plants and entering the food chain.[43] Incineration is possible but very expensive. Moreover, even incinerators capable of cutting emissions by ninety percent still produce ash containing heavy metals and organic chemicals. Burying contaminated ash presents many of the problems of land waste disposal that incineration was intended to avoid.[44] Dumping at sea raises questions similar to those applicable to water pollution.[45]

Direct transfers are only part of the picture. They are compounded by indirect transfers which take place in a number of ways. For example, pollutants discharged into the air can leave the atmosphere through precipitation or can adhere to particles carried by the wind and later be deposited on land.[46] Pollutants on land may erode with soil particles into a stream, leach into groundwater, or volatilize into air. The present fragmented system of controls does not trace the path of a pollutant through its entire ecological chain from source to receptor. Consequently, the fragmented approach does not take sufficient account of indirect cross-media transfers. To be effective, pollution controls need to trace and track every stage of a pollutant's journey, including its

39. CROSS-MEDIA POLLUTANTS, *supra* note 1, at 8-9.

40. *Id.* at 9.

41. *Id.*

42. 2 W. RODGERS, ENVIRONMENTAL LAW AIR AND WATER 124-25 (1986).

43. Feliciano, *Sludge on Lands: Where We Are, But Where Are We Going?*, 54 J. WATER POLLUTION CONTROL FED'N 1259-66 (1982).

44. Chicago Tribune, Aug. 14, 1988, at 6, § 1, col. 1; CROSS-MEDIA POLLUTANTS, *supra* note 1, at 9.

45. *See* W. Rodgers, *supra* note 7, at 488-99.

46. *See supra* note 20.

origination in a plant, its migration through the environment, and its final sinks or receptors. A proper risk evaluation, revealing where and how a substance is capable of causing harm, should be undertaken.[47] Recognition of the enormous problem caused by cross-media or inter-media transfers led the British Royal Commission on Environmental Pollution to conclude that "most of the present and future problems in environmental pollution will be of this cross-media type,"[48] and for the National Research Council in the United States to assume that "multimedia transport of pollution appears to be the rule rather than the exception."[49]

Finally, the fragmented approach considers each end-of-line source of pollution in isolation. The use of separate technologies to control discharges into a single medium means that the effects of one set of controls upon another are not considered, and that the waste loads produced are not considered simultaneously. Fragmented controls show little thought to the way in which the plant is designed, to the manner of its operation, to the distribution of wastes, and to coordination of efforts to reduce the overall impact of pollution. The wastes or residuals generated by an industrial activity have to go somewhere, yet the first destination of the wastes or residuals generated by an industrial activity is largely predetermined by plant design and pollution control technology. Thus, in order to induce changes in technology that reduce or eliminate some of the pollutants in question, effective pollution controls should target plant design and production methods. Pollution controls should attempt to reach the best balance of residuals. This, however, is not usually the case.

The present approach also lacks economic efficiency. Pollution controls already in place ensure that wastes cannot be discharged or offloaded onto the environment at a polluter's option. In a case where air pollution controls require a plant to reduce air pollution, the atmospheric gases and dusts created by a plant may be trapped in a spray of water or washed out of filters. The resulting polluted water could be discharged into a river or directly into the sea. The water could also be piped into a lagoon to settle and dry out and then be disposed of on land as solid waste. In this example, the efforts to meet air pollution requirements might lead to water discharges or solid waste disposal problems that cause greater overall damage to the environment than might be the case if the wastes had been distributed differently. It is also possible that other controls applicable to water and land could prevent the wastes resulting from air pollution controls from simply being dis-

47. CROSS-MEDIA POLLUTANTS, *supra* note 1, at 4.
48. RCEP, No. 10, *supra* note 1, ¶ 6.35.
49. NATIONAL RESEARCH COUNCIL, *supra* note 1, at 4.

charged into water or disposed of as solid waste, without further treatment. Because additional costs are involved, the question becomes whether such costs can be justified.

A more efficient and cost-effective method of pollution control would be to divide the wastes between the three media of water, air and land, thus making optimum use of the environment and of any special or particular assimilative capacity it might possess. Lawmakers must consider whether the present controls make optimal use of the environment as a resource, or whether these controls are too stringent in one place and too lax in another.[50]

B. Reasons for Fragmented Controls

The late 1960s and the early 1970s were a period in which the "policy primeval soup"[51] of environmental policy bubbled with a rich mix of ideas. Ideas based on integration prevailed and gave birth to two notable developments: the National Environmental Policy Act (NEPA) and the Environmental Protection Agency (EPA). These developments marked the high tide of environmentalism, yet two following pieces of legislation flowed in a different direction. Out of the dialectic interaction between fragmentation and integration, fragmentation emerged as the more powerful policy stream.

The predominance of fragmentation is borne out first in the Clean Air Act of 1970, which was signed into law just thirty days after EPA began operations,[52] and the 1972 amendments to the Federal Water Pollution Control Act. Both acts contained provisions dictating clear goals, specific means by which these goals should be achieved, and rigorous timetables for implementing these goals and means. Such provisions overran the integrative thrust of NEPA and EPA. The Clean Air Act of 1970, for example, required EPA to set quantitative primary and secondary air quality standards[53] and to produce a timetable for (1) designating air quality control regions,[54] (2) issuance of air quality criteria and information on air pollution techniques for major pollutants,[55] (3) establishment of ambient air quality standards for major

50. *See, e.g.*, B. ACKERMAN & W. HASSLER, CLEAN COAL/DIRTY AIR 10-12 (1981); A. KNEESE & C. SCHULTZE, POLLUTION, PRICES, AND PUBLIC POLICY 81 (1975); Krier, *The Irrational National Air Quality Standards: Macro- and Micro-Mistakes*, 22 UCLA L. REV. 323, 324-30 (1974).

51. J. KINGDON, AGENDAS, ALTERNATIVES AND PUBLIC POLICIES 122-23 (1984).

52. A. MARCUS, PROMISE AND PERFORMANCE CHOOSING AND IMPLEMENTATION OF ENVIRONMENTAL POLICY 56-57 (1980). Marcus sets out an interesting chronology tracing the parallel developments leading to the creation of the EPA and the enactment of the Clean Air Act of 1970.

53. 42 U.S.C. § 7409 (1982).

54. *Id.* § 7407.

55. *Id.* § 7408.

pollutants,[56] (4) preparation of implementation plans by the states,[57] (5) review and revision of those plans by EPA,[58] and (6) enforcement of the plans. The Federal Water Pollution Control Act of 1972 (FWPCA)[59] set at least six similar legislative deadlines.[60]

The greater force of fragmentation is further evidenced by the way in which EPA was exempted from making environmental impact assessments under NEPA. A fundamentally important step towards an integrated approach lies in ascertaining the total environmental impact of an activity. That essential first stage is provided for in NEPA. It requires that all agencies of the federal government make environmental impact assessments where their proposed actions might significantly affect the environment.[61] A plain reading of NEPA leaves no doubt that the making of environmental regulations constitutes an action significantly affecting the environment. It would seem to follow, therefore, that EPA should be legally obliged to make environmental impact assessments when undertaking their regulatory functions. When making environmental impact assessments, EPA would confront the inescapable cross-media impacts of their regulations and be compelled to evaluate both the wisdom and the necessity of an integrated approach.

EPA did not become engaged in this exercise for a number of reasons. To begin with, Senator Edmund Muskie sought to exclude air and water pollution controllers from the application of NEPA.[62] Additionally, the deadlines in the Clean Air Act relating to the preparation of implementation plans for meeting national ambient standards[63] argua-

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56. *Id.* § 7409.

57. *Id.* § 7410(a)(1).

58. *Id.* §§ 7410(a)(2), 7410(c)(2).

59. 33 U.S.C. §§ 1251-1387 (1982 & Supp. III 1985).

60. These were to (1) issue effluent guidelines to major industrial categories by 1973, (2) grant permits to all water pollution sources by 1974, (3) ensure that the best practicable water pollution technology was installed by 1977, (4) make all major waterways in the United States fishable and swimmable by 1981, (5) ensure that all polluting sources installed the best available technology by 1983, and (6) ensure that all polluting discharges into the nation's waterways be eliminated by 1985.

61. 42 U.S.C. § 4332(2)(c) (1982).

62. *See infra* text accompanying notes 95-115. NEPA's basic substantive policy was to ensure that the federal government "use all practicable means and measures" to protect environmental values, avoid environmental degradation, preserve historic, cultural, and natural resources, and promote the widest range of beneficial uses of the environment without undesirable and unintended consequences. 42 U.S.C. § 4331 (1982). Congress directed that to the fullest extent possible the policies, regulations and public laws of the United States shall be interpreted and administered in accordance with NEPA and that all agencies of the federal government should follow the procedures set out in NEPA. *Id.* § 4332. The procedures set out that responsible officials of all agencies should prepare a detailed statement covering the impact of particular actions on the environment, the environmental costs which might be avoided, and alternative measures which might alter the cost-benefit equation. *Id.* § 4332(2)(c).

63. Such plans were to include adequate provision for enforcing, monitoring and limiting emissions, and were designed to achieve and maintain the ambient air quality standards re-

bly could have prevented EPA from undertaking the strict and formal environmental assessments required by NEPA. Stringent timetables applicable to the setting of emission standards for new stationary sources could have presented similar problems. The court in *Portland Cement Ass'n v. Ruckelshaus*[64] viewed those time constraints[65] as a "substantial consideration" in deciding that EPA was not subject to NEPA.[66] *Portland Cement* and other cases following it, however, interpreted the new stationary source requirements as setting out the "functional equivalent" of a NEPA assessment.[67] In some instances, a regulatory authority was obliged to take account of cross-media impacts. But:

> [I]n other instances the relevant statutory provision would seem to preclude considerations of effects in other media. Thus the prospects of serious water pollution generated by air pollution control devices such as stack scrubbers, would apparently not be grounds for an extension of the deadlines for achieving the primary ambient air standards in section 110 of the Clean Air Act, nor would a comparable threat of air pollution permit EPA to excuse an industrial source of water pollution from complying with FWPCA's technology based effluent limitation deadlines.[68]

Finally, the express statutory exemption from NEPA assessments granted under the FWPCA, and later under the Clean Air Act, served to confirm and supply an even firmer foundation to the segmented and discrete approach to pollution control embodied in some of their provisions. Equally important, the exemption reflected EPA's own predilec-

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ferred to. 42 U.S.C. § 1857c-5(a)(1) (1970). These plans had to be approved or disapproved within four months of submission. *Id.* § 1857c-5(a)(2). The sole criterion for approval or disapproval of a state implementation plan was whether it would provide for the attainment and maintenance of air quality standards within three years from its effective date. *Id.* § 1857c-5(a)(2)(A)(i). In interpreting this provision, EPA's task force concluded that even where national standards could be met only by creating substantial problems of water or land pollution, EPA was not empowered to reject state plans so long as they did provide for meeting the air quality standards. ENVIRONMENTAL PROTECTION AGENCY, APPLICATION OF THE NEPA TO EPA'S ENVIRONMENTAL REGULATORY ACTIVITIES: TASK FORCE REPORT 18 (1973) [hereinafter TASK FORCE REPORT].

64. 486 F.2d 375 (D.C. Cir. 1973), *cert. denied*, 417 U.S. 921 (1974).

65. For example, with regard to new stationary sources, the 1970 Clean Air Act directed the Administrator to publish a list of such sources within 90 days. 42 U.S.C. § 1857c (b)(1)(A) (1970). Within 120 days after publication, EPA had to propose emission limitations, labeled "standards of performance," and promulgate final standards within 90 days of this. *Id.* § 1857c-6 (b)(1)(B). Thus, EPA was allowed only 300 days from the date of enactment to promulgate new source emission standards. EPA pleaded inability to carry out the requirements of NEPA. They argued that the specific provisions of the Clean Air Act should take priority over "any peripheral or indirect consequences" referred to in NEPA. Brief for EPA at 21-22, Appalachian Power Co. v. EPA, 486 F.2d 427 (D.C. Cir. 1973) (No. 72-1079).

66. *Portland Cement*, 486 F.2d at 381.

67. *Id.* at 384.

68. R. STEWART & J. KRIER, *supra* note 29, at 800.

tions. Some analysts have suggested that the Clean Air Act and FWPCA "failed to even pay lip service to cross-media considerations,"[69] but this analysis is not entirely accurate. There were some integrative strands, and as this Article argues, these strands may be meshed with subsequent legislation to provide a more integrative web of policy and law. In the early 1970s, however, the thrust of the Clean Air Act, FWPCA and other legislation was decidedly segmental.

It is useful to understand why Congress legislated in the way it did.[70] To the extent that some reference to political theory is unavoidable, this part of the exposition supports the dynamic view of the policy-forming process taken by political scientists such as John Kingdon and James Q. Wilson. Kingdon rejects the doctrinally simplistic "public choice"[71] theories of legislation, as well as the usual political science preoccupation with pressure and influence.[72] Instead, he makes excursions into the world of ideas and politics, and recognizes their importance in the form and content of legislation.[73] Wilson has clarified why

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69. B. RABE, *supra* note 1, at 11.

70. There is no pretence that what is being undertaken represents an excursion into institutional political science theory, or theories of legislation. This is no more than a modest effort to point to ideas, concepts and persons who influenced the legislation being discussed.

71. Like Kingdon, this Article rejects the unsophisticated "public choice" model of legislation advocated primarily by economists and also by a few legal camp followers. These "public choice" theorists apply economic theory to political decisionmaking, and treat the legislative process as a microeconomic system in which actual political choices are determined by the efforts of individuals and groups to further their own interest. *See* D. MUELLER, PUBLIC CHOICE (1979); J. BUCHANAN & G. TULLOCK, THE CALCULUS OF CONSENT 1-9, 17-39 (1962); A. DOWNS, AN ECONOMIC THEORY OF DEMOCRACY 27-31, 291, 295 (1957); Landes & Posner, *The Independent Judiciary in an Interest-Group Perspective*, 18 J. L. & ECON. 875 (1975); Easterbrook, *Statutes Domain*, 50 U. CHI. L. REV. 533 (1983). For a fuller review of public choice literature, see Farber & Frickey, *The Jurisprudenee of Public Choice*, 65 TEX. L. REV. 873 (1987).

72. *See* R. DAHL, A PREFACE TO DEMOCRATIC THEORY 132-51 (1956); D. TRUMAN, THE GOVERNMENTAL PROCESS (2d ed. 1971) (especially vii-xii, xvii-xlviii, 501-35); A. BENTLEY, THE PROCESS OF GOVERNMENT 208-22, 260-61 (1967); T. LOWI, THE END OF LIBERALISM 42-63 (2d ed. 1979); E. SCHATTSCHNEIDER, THE SEMI SOVEREIGN PEOPLE 20-46 (1960); L. MILBRATH, THE WASHINGTON LOBBYISTS 28-53 (1963); R. BAUER, I. POOL & L. DEXTER, AMERICAN BUSINESS AND PUBLIC POLICY 127-53, 321-99 (1963); K. SCHLOZMAN & J. TIERNEY, ORGANIZED INTERESTS AND AMERICAN DEMOCRACY 1-13, 386-410 (1986).

73. Kingdon, *supra* note 51. Kingdon borrows from the "garbage can" model of organizational choice, described in Cohen, March & Olsen, *A Garbage Can Model of Organizational Choice*, 17 ADMIN. SCI. Q. 1 (1972), that views the political system as a garbage can in which "streams" exist. The streams consist of "problem recognition," "policy proposals," and "politics." *Id.* at 92. He suggests that the enactment of a law requires the convergence of all three streams, together with the presence of an "entrepreneur" to guide the law's passage through Congress. Kingdon's analysis can be adapted and applied to the Clean Air Act and FWPCA to explain their form and shape. "Problem recognition" consisted of how air and water pollution was perceived. The felt necessities of the time dictated that a serious problem existed. "Politics" refers to the state of public opinion, which after "Earth Day" was running heavily in favor of fast and effective environmental action. The "policy proposals" which arose in response to the perceived environmental crisis were influenced by a powerfully articulated disenchantment with New Deal beliefs in the ability of expert administrators to solve social problems. The "entrepreneurs" re-

the politics of legislation and regulation cannot be explained by one neat model of predictive behavior based on rent-seeking legislators.[74]

1. DISAFFECTION WITH NEW DEAL IDEALISM

The crucible of ideas in the 1960s gave rise to two different currents of thinking. On the one hand, environmentalism in the late 1960s was rooted in holistic and ecological thinking which found expression in the enactment of NEPA and the creation of EPA. On the other hand, serious doubts about whether the New Deal belief in independent and expert administrative agencies could creatively regulate a complex social problem in the public interest affected the approaches taken to environmental problems.[75] As we shall see in Section III C.1, beliefs in interconnected ecosystems offer a holistic, rather than a fragmented, view of the world. Translating this world view into practice required the integration of political and administrative policies dealing with the environment. Air, water and land were part of one environment and did not constitute separate and discrete entities. However, the complex and uncertain nature of environmental problems did not admit of preordained solutions. To legislate in advance on how the balance should be struck in the myriad of situations crying out for solutions would only create procrustean beds. Pollution control required fine and expert balancing that could best be done by expert and sensitive agencies vested with power over the whole environment and empowered to act in the particular circumstances of the case. An integrated approach called for a broad delegation of power. Arguments for integration based on ecological thinking, however, were countered by others which resisted the granting of wide discretionary power.

During the New Deal, champions of the administrative process prevailed with their view that there was an objective public interest that could be ascertained and implemented by expert administrators.[76] Their approach came under heavy attack from political scientists[77] on constitutional and political grounds. The constitutional objection has

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sponsible for the Clean Air Act and FWPCA were Ralph Nader and Senator Edmund Muskie, respectively.

74. Wilson divides the politics of legislation and regulation into four types: majoritarian, interest group, client and entrepreneurial. J. WILSON, THE POLITICS OF REGULATION 367-70 (1980). *See infra* note 104 and accompanying text.

75. Ackerman & Hassler, *supra* note 34, at 1468.

76. Stewart, *The Reformation of American Administrative Law*, 88 HARV. L. REV. 1667, 1682-85 (1975); Ackerman & Hassler, *supra* note 34, at 1471-74; Sunstein, *Constitutionalism After the New Deal*, 101 HARV. L. REV. 421, 460-61 (1987).

77. Jaffe, *The New Deal Agency-A New Scapegoat*, 65 YALE L.J. 1068 (1956). *See also* Jaffe, *supra* note 10, at 232 (pointing out that lawyers, as distinct from political scientists, were partial to the independent administrative agencies).

still not been resolved,[78] but the political argument has nevertheless prevailed. Those attacking the technocratic philosophy charged that independent agencies, having no duly constituted master, were falling under the domination of private interests, usually the very interests whose activities they were supposed to regulate.[79] A somewhat different criticism was leveled by economists who saw regulation as being inefficient because it was created and administered for the benefit of well-organized interests at the expense of the public. These critics either advocated deregulation or regulatory reform. Ironically, political and economic critics of regulation agreed that regulation benefitted the regulated rather than the public.[80]

By the end of the 1960s, much of the regulation in the United States was seen to be in "deep trouble."[81] It became necessary to face up to the problem of how agencies had misused and even abused the broad delegated power conferred upon them. Confidence in the ability of administrative agencies to implement statutes effectively and in the public interest had apparently evaporated. Many influential commentators referred to the problems arising out of the unsatisfactory or inadequate implementation of the legislative mandates given to administrative agencies. They suggested that one way of remedying this problem lay in statutes with clear mandates and definite obligations.[82] One reason for the malaise was the nature of the legislative mandate. According to one critic, statutory mandates lacked clarity and rarely provided clear directions to the new agency.[83] The vagueness was deliberate and resulted from the lobbying of well-organized private groups who were the subject of the regulation. Having failed in their efforts to prevent the

78. The constitutional objection was, first, that all executive functions should be subject to presidential control and that independent agencies were a headless fourth branch of government. Secondly, it was argued that these independent agencies combined powers previously distributed among the three traditional branches. *See* S. BREYER & R. STEWART, ADMINISTRATIVE LAW AND REGULATORY POLICY 128 (2d ed. 1985).

79. *See, e.g.*, T. LOWI, *supra* note 72; R. FELLMETH, THE INTERSTATE COMMERCE COMMISSION: THE PUBLIC INTEREST AND THE ICC 311-25 (1970); J. TURNER, THE CHEMICAL FEAST 185-246 (1970).

80. *See* sources cited *infra* note 179; P. MACAVOY, THE CRISIS OF THE REGULATORY AGENCIES (1970). For a succinct survey of these criticisms, see S. BREYER & R. STEWART, *supra* note 78, at 36-38. For a fuller discussion, see *infra* text accompanying notes 178-221.

81. R. NOLL, REFORMING REGULATION 110 (1971). Whether this perception was valid is open to question. *See* J. WILSON, *supra* note 74, at 362.

82. *See* M. BERNSTEIN, REGULATING BUSINESS BY INDEPENDENT COMMISSION 286 (1955); Bernstein set up an influential model of agency obsolescence in which he traced the cycle of a regulatory agency from gestation to youth, youth to maturity, and maturity to old age when the agency suffered debility and decline and "surrendered" to the regulated. *Id.* at 74-102. *See also* K. DAVIS, ADMINISTRATIVE LAW TREATISE 9-53 (1958); H. FRIENDLY, THE FEDERAL ADMINISTRATIVE AGENCIES: THE NEED FOR BETTER DEFINITION OF STANDARDS 165-68 (1962); T. LOWI, *supra* note 72.

83. M. BERNSTEIN, *supra* note 82, at 75-76.

enactment of legislation affecting them, these private groups concentrated on making the regulatory provisions as vague and innocuous as possible,[84] confident that they could "capture" the agency in question. The unwillingness or inability of Congress to give better directives to its agencies was also criticized.[85]

Professor Kenneth C. Davis, in his Administrative Law Treatise and later in his book *Discretionary Justice*,[86] had demonstrated with compelling and devastating effect, the injustice and dangers of unnecessarily wide delegation of discretionary power. In his book *The End of Liberalism*,[87] Theodore Lowi synthesized the criticisms of the New Deal agencies and suggested that one remedy for many of their troubles might lie in statutes which had clear goals and explicit means of implementation.[88] These new statutory norms would target and institutionalize the public needs which led to the statute in the first place, and would make it difficult for the agency to postpone the performance of its obligations.[89] One of the central themes present when environmental legislation was being formed, therefore, was that expertise could be an excuse for inaction, and even worse, could be captured by special interests. The remedy suggested by believers in regulation was the enactment of legislation setting forth explicit goals, specific means by which these goals could be attained, and rigorous timetables in which to do so.

2. PRAGMATISM AND INCREMENTALISM

Another compelling policy stream which converged with New Deal dissatisfaction with expert solutions to complicated problems was that of pragmatic incrementalism or "muddling through." A number of writers emphasized the incremental nature of policy formulation and decisionmaking[90] and doubted the practical applicability of a comprehensively rational model of decisionmaking. They pointed out that decisionmakers have neither the assets nor the time to collect the information required for rational choice. When making choices, decisionmakers do not confront a limited universe of relevant conse-

84. *Id.* at 96.

85. H. FRIENDLY, *supra* note 82, at 168.

86. *See supra* note 82; K. DAVIS, DISCRETIONARY JUSTICE (1977).

87. *See supra* note 72.

88. This was not the only suggested method of relief. Others demanded that the agencies should redeem their New Deal promise by generating clear standards through creative rulemaking. *See* Ackerman & Hassler, *supra* note 34, at 1479. Another solution was to look to the courts for action. *See* Jaffe, *supra* note 10, at 235.

89. T. LOWI, *supra* note 72, at 125-56.

90. *E.g.*, D. BRAYBROOKE & C. LINDBLOM, A STRATEGY OF DECISION 37-57, 61-110 (1963); R. DAHL & C. LINDBLOM, POLITICS, ECONOMICS AND WELFARE 82-88 (1953).

quences; instead, they face an open system of variables in which all consequences cannot be surveyed. A decisionmaker attempting to adhere to the tenets of a rationalistic model will become frustrated, exhaust his resources without coming to a decision, and remain without an effective decisionmaking model to guide him.[91] With specific reference to environmental policy, Charles Lindblom was skeptical about integrated environmental management. At a conference organized under the auspices of the EPA in 1973, he articulated his doubts about a policy which adopted an holistic approach to the environment. He argued that precisely because everything is interconnected, the environmental problem is beyond our capacity to control in one unified policy. The very enormity of the interconnected environment makes it impossible to treat as a whole. Critical points of intervention (tactically defensible or strategically defensive points of intervention) must be found.[92] According to this argument, a step-by-step approach will solve a problem better than one based upon the necessarily incomplete analysis offered by comprehensive rationality.

The appeal of incrementalism as an approach to environmental protection becomes immediately evident. When faced with a particularly difficult problem of pollution in one medium, the natural response is to solve that problem. An environmental crisis usually manifests itself in one medium, and its linkage with other media is often unknown. Finding time to devise a comprehensively rational way of dealing with the problem required exceptional sagacity, especially when from Boston to Washington, a summer-long siege of "daily air pollution alerts" left "little doubt . . . that the country was facing an air pollution crisis."[93] Congressman Rogers, referring to the problems of air pollution, could well have been echoing the feelings of fellow congressmen in stressing the immediacy of the problem: "Air pollution is one of the most pressing forms of pollution because unlike others, the air around us is unavoidable. We do not have to swim or look at dying lakes. But

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91. In his well-known article *The Science of Muddling Through*, Professor Charles Lindblom explained that a "rational-comprehensive" analysis which adopts a synoptic view of a problem, collects all relevant information, and explores all relevant solutions after considering all relevant answers, in order to arrive at a policy decision, is quite impossible. Such an approach, which is admittedly marked by clarity of objective, explicitness of evaluation, a high degree of comprehensiveness of overview, and possible quantification of values for mathematical analysis, was only possible when dealing with small scale problems with a very limited number of variables. Lindblom, *The Science of Muddling Through*, 19 PUB. ADMIN. REV. 79, 79-82 (1959) [hereinafter Lindblom, *Muddling*]. He has suggested, therefore, that poor as it is, incremental politics ordinarily offers the best chance of offering beneficial political changes. Lindblom, *Still Muddling, Not Yet Through*, 39 PUB. ADMIN. REV. 517, 521 (1979).

92. Lindblom, *Incrementalism and Environmentalism*, in MANAGING THE ENVIRONMENT 83 (1973).

93. 116 CONG. REC. 42,381 (1970) (remarks of Sen. Muskie).

everyone must breathe."[94] In that context, the need to do something about air pollution at least, and to cross one bridge at a time, becomes understandable. The same was true of water pollution, and politicians responded to the call for quick, demonstrable action against pollution in the legislation that followed.

3. THE POLITICAL CONTEXT

A fragmented approach to legislation also arose from the way in which jurisdiction over environmental legislation was carved up between congressional committees.[95] Environmental legislation is almost entirely drafted and piloted through Congress by committees. It is a rare occurrence for the full House or Senate to overturn a committee decision.[96] The committees responsible for various aspects of environmental law and policy guard their jurisdiction jealously.[97] In the late 1960s and the early 1970s, the Subcommittee on Air and Water Pollution Control of the Public Works Committee had the primary responsibility for air and water pollution legislation. It was headed by Senator Muskie, then the dominant congressional figure in pollution control.[98] Another committee which assumed some influence and importance in formulating environmental policy was the Committee on Interior and Insular Affairs, chaired by Senator Henry Jackson. He was the architect of NEPA, which sought to place environmental policy within an integrated framework.[99] Muskie resisted attempts to extend NEPA to air and water pollution control agencies. At one level, his approach to NEPA was an exercise in turf protection.[100] Accordingly, it has been suggested that Muskie was more concerned with keeping air and water pollution control under the jurisdiction of the subcommittee of the Senate Public Works Committee, which he chaired, than with preventing integration. He was engaged in the gambit of preventing encroachment

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94. 116 CONG. REC. 19,210 (1970).

95. Committee jurisdiction covers three areas: (1) formulating and approving legislation, (2) conducting oversight hearings and investigations, and (3) reviewing and approving appropriations. *See* J. DAVIES & B. DAVIES, THE POLITICS OF POLLUTION 61-79 (2d ed. 1976).

96. *Id.* at 61.

97. It has been pointed out that "jurisdictional politics is an ubiquitous feature of present day congressional policy making. To hold jurisdiction means to claim a piece of the action. Therefore, jurisdiction is as central to the life of a member or a congressional subunit as votes or the ability to hire staff." Davidson, *Subcommittee Government: New Channels for Policy Making*, in THE NEW CONGRESS 118-19 (T. Mann & N. Ornstein eds. 1981).

98. J. DAVIES & B. DAVIES, *supra* note 95, at 63-66; A. MARCUS, *supra* note 52, at 53-78.

99. *See supra* note 62.

100. Professors Ackerman and Stewart have noted that powerful organized interests such as congressional committees have vested interests in protecting the status quo. Ackerman & Stewart, *Reforming Environmental Law*, 37 STAN. L. REV. 1333, 1333-34 (1985).

on the agencies under his committee by Jackson's Interior and Insular Affairs Committee, which had drafted NEPA.[101]

The symbiotic political relationship between public interest activists and subcommittee chairpersons interested in gaining national prominence has been explained and substantiated.[102] What happened with the Clean Air Act was strikingly different. Muskie had been the chief architect of the air and water pollution legislation passed by Congress in the 1960s, and his Senate Subcommittee on Air and Water Pollution began drafting amendments to the Clean Air Act in 1970. Case studies on the enactment of the Clean Air Act reveal the extent to which Ralph Nader's intervention, through the publication of John Esposito's *Vanishing Air* in 1970, led to a dramatic tightening of the provisions of the final bill presented by Muskie's subcommittee.[103] They also reveal the extent to which Muskie's presidential campaign in 1972 made him especially vulnerable to political pressure of the entrepreneurial kind.

James Q. Wilson has clarified four different manifestations of the politics of legislation and regulation: majoritarian, interest group, client and entrepreneurial. According to Wilson, the Clean Air Act of 1970 was not the result of interest group politics, but rather the entrepreneurial politics of Ralph Nader.[104] Wilson's explanation is con-

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101. Comment, *Implementation of the Clean Air Act: Should NEPA Apply to the Environmental Protection Agency?*, 3 ECOLOGY L.Q. 597, 602 (1973) [hereinafter *Should NEPA Apply*]; Comment, Kalur v. Resor, *Water Quality and NEPA's Application to EPA*, 2 ENVTL. L. REP. 10,025, 10,029 (1972) [hereinafter *Water Quality*]. For a seemingly contrary view, see Liroff, who suggests that "[w]hile the Senators' disagreements were largely based on jurisdictional jealousies, they derived as well from a fundamental difference in outlook concerning the manner in which protection for environmental values should be provided in federal decision making." R. LIROFF, A NATIONAL POLICY FOR THE ENVIRONMENT 11 (1976). It would seem, however, that this 'fundamental difference' related to the efficacy of policing NEPA, and not to the need for integrated environmental evaluation and action. *Id.* at 18-20.

102. Wilson, *The Politics of Regulation*, in SOCIAL RESPONSIBILITY AND THE BUSINESS PREDICAMENT 145 (J. McKie ed. 1974).

103. A. MARCUS, *supra* note 52, at 53-85; ACIR, PROTECTING THE ENVIRONMENT, *supra* note 10, at 23-24; Elliot, Ackerman & Millian, *Toward a Theory of Statutory Evolution: The Federalization of Environmental Law*, 2 J. L. ECON. & ORGANIZATION 313 (1985).

104. Traditional interest group politics sees legislation as the outcome of a competitive struggle among groups with differing interests. *See supra* note 72. However, Wilson's persuasive analysis limits the application of interest group politics to situations in which the public at large do not see themselves being affected by a regulation. *See supra* note 74. A regulation attracting interest group politics will typically benefit a small group at the expense of a comparable small group. Each side has a strong incentive to organize and exercise political influence. *Majoritarian politics* is found where the costs and benefits of a contemplated action are widely distributed and most of society is expected to gain or pay. Interest groups have little incentive to form around such issues because no small, definable segment of society, such as an industry, occupation or locality, can expect to capture a disproportionate share of the benefits. Where costs and benefits are narrowly concentrated, conditions are ripe for *interest group politics*. Where the benefits of a prospective policy are concentrated, but the costs widely distributed, *client politics* is likely to result. Some small, easily organized group will benefit, and thus have a powerful incentive to organize and lobby. Since the costs of the benefit are distributed at a low per capita rate over a large number of

sistent with an arresting theory of the "prisoner's dilemma" offered by Elliot, Ackerman and Millian.[105] They argue that the Clean Air Act was enacted at a time when environmentalists were not well organized as an interest group in Washington. Accordingly, interest group politics as usually understood did not operate. However, there did exist unrestrained competition between two presidential aspirants—President Nixon and Senator Muskie[106]—for credit from legislation assuring the public of a cleaner world. In 1970, Muskie was vulnerable not only because he was a presidential candidate, but also because the 1967 Air Quality Act, which he had drafted, was not working satisfactorily.[107] Elliot, Ackerman and Millian's theory appears to be well substantiated by the sequence of events leading to the Clean Air Act. On December 10, 1969, Muskie introduced a bill which sought little more than an incremental change to the law controlling air pollution.[108] Two months later, Nixon submitted his own proposals to Congress calling for a far more substantial change in the law, necessitating a major structural change in existing federal air pollution statutes.[109] Three weeks after Nixon's proposal, Nader's task force published their report harshly criticizing Muskie and alleging that he was soft on industry.[110] In August, Muskie's subcommittee reported out a revised bill which essentially followed Nixon's proposals but was even tougher. That tougher and more stringent law—the 1970 Clean Air Act—was subsequently signed into law by Nixon, despite his grave reservations over its exact-

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people, there is little incentive to organize in opposition. Finally, where a policy is proposed that will confer general but small benefits at a cost to be borne chiefly by a small segment of society, we witness *entrepreneurial politics*. Where this is the case, the incentive to organize is strong for opponents of the policy, but weak for the beneficiaries while the political system provides many points at which opposition can be registered. In these circumstances, it requires the efforts of a skilled entrepreneur who can mobilize latent public sentiment, associate the legislation with widely shared values, and put the opponents of the plan publicly on the defensive.

105. Elliot, Ackerman & Millian, *supra* note 103.

106. Senator Muskie was chairman of the Subcommittee on Air and Water Pollution of the Senate Committee on Public Works. He had been involved in pollution control for many years and was a frontrunner among the Democratic Party's candidates for president. *See generally* A. MARCUS, *supra* note 52, at 53-82.

107. *Id.*

108. Marcus' characterization of it as a "minor tinkering" with the 1967 law has been endorsed by Elliot, Ackerman & Millian. *Id* at 60; Elliot, Ackerman & Millian, *supra* note 103.

109. "Environmental Quality: The Presidential Message to Congress Recommending a 37 Point Administrative and Legislative Program," WEEKLY COMP. PRES. DOC., 160, 164 (1970). The proposals, though advocating a qualitative change to the existing structure of air pollution by establishing nationwide air quality standards and national emission standards, was still fragmented in its approach and dealt with air, water and solid waste management as if they were independent and separate problems. The message, however, did recognize that federal institutions dealing with the environment and natural resources had developed piecemeal over the years, and it appointed Roy Ash to make a thorough study of the organization of federal environmental, natural resource and oceanographic programs. *Id.* at 171. It was the work of the Ash reorganization study that laid the foundations for EPA. *See generally* A. MARCUS, *supra* note 52, at 31-52.

110. J. ESPOSITO, VANISHING AIR 290-92 (1970).

ing demands on industry. Elliot, Ackerman and Millian's conclusions are that Nader's report, threatening Muskie with the loss of his reputation as Mr. Clean, had the effect of trapping both Nixon and Muskie in a politician's dilemma. The report compounded pressure on both politicians by exploiting the difficulty that the public has in identifying politicians who deserve credit for enacting legislation in response to perceived need. As a result, both were forced to support legislation more stringent than either would have preferred.

Unfortunately, the Nader organization, while executing a remarkable coup, also succeeded in further entrenching the fragmented approach. Though they were scathing critics of the bureaucratic inertia displayed by the National Air Pollution Control Administration (NAPCA) in the Department of Health, Education and Welfare (HEW),[111] Esposito and Nader displayed little awareness of the interrelated nature of the problem of air pollution. They denigrated the difficulties of pollution control caused by the need to relate emission standards to ambient air quality standards. They ridiculed the reliance on experts.[112] Underlying their criticisms was a deep suspicion of the view that the atmosphere should be used to its optimal capacity. This view was seen as the basis on which the environment was exploited and plundered by corporate polluters in city after city.[113] Overall, these criticisms reflected dissatisfaction with bureaucratic implementation and a disillusionment with the New Deal ideal of expert administrators. The Nader answer, insofar as one was offered, appeared to be a visible and simple one: clear national emission standards.[114] That proposal was only partially adopted by the Clean Air Act. Instead, Muskie's subcommittee finally set forth explicit goals accompanied by defined means, clear deadlines and rigorous timetables. In so doing, Muskie's subcommittee sought "handles"[115] on environmental degradation that were fixed to fragmented and incremental solutions to the problems of dirty air.

4. BUREAUCRATIC PREFERENCE

The EPA was created by the Nixon Administration with the specific objective of integrating the various legislative mandates entrusted to it. Nixon's Administration envisioned an EPA that would end much

111. *Id.* at vii-ix (Nader commenting in foreword to the book).

112. *Id.* at 264. Admittedly, the immediate reference was to company experts, but the implications were clearly spelled out. NAPCA experts relied upon the "already well established tyranny of indentured experts." *Id.*

113. *Id.* at 259-98.

114. *Id.* at 307.

115. *See* A. MARCUS, *supra* note 52, at 70-71.

of the fragmentation of environmental policy. Douglas Costle, who later became EPA's administrator, directed the White House task force that handled the transition between congressional approval of the new agency and the actual start of EPA's operations. Costle believed that a reorganization of environmental regulation along functional lines was the desired long-term goal; however, he advocated that an incremental strategy was preferred in the short term.[116]

Costle recommended a three-stage plan. Initially, the five programs dealing with air, water, pesticides, solid waste and radiation, and noise would be preserved. After a period of time, three new assistant administrative offices would be created along functional lines, dealing with planning and management, standards and compliance, and research and monitoring. The five individual programs would, however, retain their separate identity in administrative offices. Finally, after the passage of a reasonable amount of time, the program distinctions were to be eliminated entirely.[117]

There were a number of reasons for Costle's caution in pushing forward with integration. To begin with, the differing policy streams leading to the creation of EPA and the passage of the 1970 Clean Air Act, proceeded along parallel paths.[118] The White House's vision of comprehensive environmental management leading to the creation of EPA was not a vision shared by Congress or embodied in the Clean Air Act of 1970. Consequently, EPA mirrored a curious policy division. On the one hand, it housed those loyal to the original philosophy of NEPA and EPA, while on the other, it was staffed by those committed to a programmatic administration based on fragmented policies. EPA was unprecedented in terms of the number and size of disparate agencies brought under a new organizational roof.[119] In many cases, the agencies had been rivals who enjoyed substantial autonomy. Costle reasoned that there would be resistance and disruption if integration were attempted immediately.[120] Most bureaucrats within EPA had a program perspective. They were tied to specific legislation, functions and

116. *Id.* at 104.

117. *Id.*

118. *Id.* at 54-57.

119. There were 10 major administrative units in all. The Federal Water Quality Administration from the Interior Department was the largest with 2670 employees and a budget of over $1 billion. NAPCA from HEW was second largest with 1100 employees and a budget of $110 million. Other major units included the Pesticides Regulation Division from the Agriculture Department with 425 employees, the Bureau of Radiological Health from HEW with 350 employees, and the Office of Pesticides Research from HEW with 275 employees. Cohen, *EPA: A Qualified Success*, in CONTROVERSIES IN ENVIRONMENTAL POLICY 179 (S. Kamieniecki, R. O'Brien & M. Clarke eds. 1986).

120. A. MARCUS, *supra* note 52, at 103-04; J. DAVIES & B. DAVIES, *supra* note 95, at 107-12; ACIR, PROTECTING THE ENVIRONMENT, *supra* note 10, at 22.

appropriations. They took their cues from Congress and reflected the pragmatic, fragmented policies of that body.[121]

Second, Costle feared that the agency would undergo a period of confusion and even chaos while its programmatic inheritance was broken down and rebuilt along functional lines.[122] The resulting confusion would prevent it from meeting the obligations of its legislative mandates and particularly the inflexible demands of the Clean Air Act. He feared the agency would come out badly injured after such a baptism of fire. This difficulty was compounded by the fear that managers of EPA's program sections would not go along with a fully integrated plan.

William Ruckelshaus, EPA's first administrator, appeared to be even more apprehensive than Costle. He accepted and carried out the first two phases of Costle's plan, but not the third phase which was to fully integrate EPA.[123] The primary reason for this was that even the limited division of duties in the second phase had led to conflict and restlessness. Apart from being nervous about their position and prospects in a new organization, the bureaucrats he had inherited from other departments and programs were loyal to specific statutes and programs and were unable to view the environment as a whole. These bureaucrats were familiar with, and committed to, these particular legislative mandates, and feared that concrete directives were in danger of being ignored in the move towards integration. They also had access to senators and representatives of congressional committees who had enacted such legislation and continued to supervise its implementation. Faced with the prospect of bureaucratic resistance and congressional criticism, Ruckelshaus decided to play safe.[124] These initial rumblings of discontent, signifying a bureaucratic preference for fragmentation, led to EPA's plea that it be excluded from NEPA, and set the stage for EPA's virtual rejection of an integrated approach.[125]

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121. J. DAVIES & B. DAVIES, *supra* note 95, at 108.

122. A. MARCUS, *supra* note 52, at 103.

123. The initial history of the EPA is recounted by Marcus. *Id.* at 85-119; *See also* J. DAVIES & B. DAVIES, *supra* note 95, at 108-18. Today, the Ruckelshaus design remains basically unchanged and "continues to be stuck in the same half-programmatic, half functional pattern." DAVIS, *The United States: Experiment and Fragmentation*, in INTEGRATED POLLUTION CONTROL IN EUROPE AND NORTH AMERICA (N. Haigh & F. Irwin eds. 1989) (forthcoming).

124. A. MARCUS, *supra* note 52, at 101-06; Marcus, *Environmental Protection Agency*, in THE POLITICS OF REGULATION 275-77 (J. Wilson ed. 1980).

125. It may be possible to explain Ruckelshaus' behavior on the basis that the crucial concern of any agency head is how to maintain the agency as a viable, credible, steady institution, rather than to make decisions that achieve the agency's prescribed goals. *See, e.g.*, C. BARNARD, THE FUNCTIONS OF THE EXECUTIVE 215, 231-34, 251-57 (1966); J. WILSON, POLITICAL ORGANIZATIONS 9-10, 13 (1973); P. SELZNICK, TVA AND GRASS ROOTS: A STUDY IN THE SOCIOLOGY OF FORMAL ORGANIZATIONS 12-13 (1969).

In several cases in which the issue was raised,[126] EPA insisted that it was not bound by the provisions of NEPA and sought to justify its position on broad policy grounds. The foundation of its policy argument was based on the nature of the objectives and deadlines embodied in the statutes EPA administers, especially the Clean Air and Clean Water Acts. The objectives and deadlines of these acts required rapid and expeditious action that would be delayed by the time involved in complying with NEPA procedures. Further, EPA argued that both acts precluded consideration of the environment as a whole, and by implication, stood in the way of an integrated approach to pollution control. EPA advanced these arguments in *Anaconda Co. v. Ruckelshaus*.[127] In *Anaconda*, the plaintiff industry sought to demonstrate that the control strategy and emission standard for sulfur dioxide proposed by EPA, which referred to state implementation plans, would create an "enormous solid waste disposal problem."[128] On appeal, the district court's holding that EPA should comply with NEPA was vacated. The court of appeals held that EPA's action was not subject to judicial review.[129] The reasoning of the district court in *Anaconda* was rejected as "myopic" in *Portland Cement Ass'n v. Ruckelshaus*,[130] a case dealing with new source performance standards. The plaintiff industries argued, inter alia, that NEPA applied and that EPA should carry out a detailed cost-benefit analysis that evaluated pollution reduction levels against incremental increases in industry expenditure.[131] The court decided that it was not necessary to reach the broad question of NEPA's applicability to EPA because section 111 of the Clean Air Act constituted a narrow exemption from NEPA.[132] Judge Leventhal resolved that any determination of the "best system of emission reduction" which took

126. Appalachian Power Co. v. EPA, 477 F.2d 495 (4th Cir. 1973); Buckeye Power Inc., v. EPA, 481 F.2d 162 (6th Cir. 1973), *cert. denied sub nom.* Big Rivers Elec. Corp. v. Environmental Protection Agency, 425 U.S. 934 (1976); Duquesne Light Co. v. EPA, 481 F.2d 1 (3d Cir. 1973), *vacated and remanded*, 427 U.S. 902 (1976); Essex Chem. Corp. v. Ruckelshaus, 486 F.2d 427 (D.C. Cir. 1973); Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375 (D.C. Cir. 1973), *cert. denied*, 417 U.S. 921 (1974); Anaconda Co. v. Ruckelshaus, 352 F. Supp. 697 (D. Colo. 1972), *rev'd*, 482 F.2d 1301 (10th Cir. 1973); Getty Oil Co. v. Ruckelshaus, 342 F. Supp. 1006 (D. Del. 1972), *aff'd*, 467 F.2d 349 (3d Cir. 1972), *cert. denied*, 409 U.S. 1125 (1973); Environmental Defense Fund v. EPA, 489 F.2d 1247 (D.C. Cir. 1973); Wyoming v. Hathaway, 525 F.2d 66 (10th Cir. 1975), *cert. denied*, 426 U.S. 906 (1976); Maryland v. Train, 415 F. Supp. 116 (D.Md. 1976).

127. *See supra* note 126; *Should NEPA Apply, supra* note 101, at 622.

128. *Id.* (citing Brief for Anaconda Co. at 38, Anaconda Co. v. Ruckelshaus, 352 F. Supp. 697 (D. Colo. 1972) (No. C-4362)).

129. *Anaconda*, 482 F.2d at 1301. First, because Congress had made the court of appeals the exclusive forum, and second, because the proposed regulation had not yet been adopted. *Id.* at 1304-05.

130. 486 F.2d 375.

131. *Should NEPA Apply, supra* note 101, at 617 (citing Brief for Portland Cement Ass'n at 35, Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375 (D.C. Cir. 1973) (No. 72-1073)).

132. *Portland Cement*, 486 F.2d at 384.

"into account the cost of achieving such reduction"[133] constrained the Administrator to consider counterproductive environmental effects, as well as the cost to industry.[134] Together with a statement of reasons, these factors constituted the "functional equivalent" of a NEPA impact statement and exempted EPA from the stricter requirements of NEPA.[135] The fact that the time involved in complying with NEPA, as interpreted by the courts, would have prevented EPA from meeting the rigorous and inflexible time schedules set out in the Clean Air Act was regarded as a "substantial," even if it was not a decisive, consideration.[136]

A similar decision was reached in *Essex Chemical Corp. v. Ruckelshaus*,[137] a case consolidated with *Appalachian Power Co. v. EPA*.[138] The petitioner corporation maintained, inter alia, that in promulgating standards for sulfuric acid, EPA had failed to consider the adverse impact on water caused by tail gas scrubbers which the new source performance standards required.[139] The corporation argued that EPA should have complied with NEPA. EPA admitted in response that the setting of standards might involve other environmental impacts. However, because the language establishing NEPA was general and the provisions of the Clean Air Acts were specific, the specific provisions should prevail.[140] EPA argued that strict time limits were set for compliance because the Clean Air Act was based on the premise that air pollution was at crisis levels.[141] The application of NEPA would be inconsistent with the time constraints central to the Clean Air Act. The court found no reason to divert from or expand on the logic of the *Portland Cement* decision, and held that NEPA impact statements were not a condition to making section 111 determinations.[142]

The court in *Kalur v. Resor*[143] went against the tide, and held that the Army Corps of Engineers was fully subject to NEPA in exercising its powers under the Refuse Act Permit Program. The Corps of Engineers could not delegate its statutory authority under the Refuse Act to EPA.[144] Congress responded by exempting EPA from that responsibility. The Clean Water Act does not require EPA to prepare impact state-

133. *Id.* at 385.
134. *Id.*
135. *Id.* at 384.
136. *Id.* at 381.
137. 486 F.2d 427 (D.C. Cir 1973), *cert. denied*, 416 U.S. 969 (1974).
138. *Id.*
139. *Id.* at 439.
140. Brief for EPA at 21, Appalachian Power Co. v. EPA, 486 F.2d 427 (D.C. Cir. 1973) (No. 72-1079).
141. *Id.* at 15. *See also Should NEPA Apply, supra* note 101, at 606.
142. *Appalachian Power*, 486 F.2d at 431.
143. 335 F. Supp. 1 (D.D.C. 1971).
144. *Id.* at 14-15.

ments to accompany its actions except when dealing with grants to municipalities for waste treatment facilities or with permits for discharges from new sources.[145] Similarly, the Energy Supply and Environmental Co-ordination Act of 1974 provided that no action taken by EPA under the Clean Air Act required an environmental impact statement.[146] Furthermore, EPA determined that regulations under the Resource Conservation and Recovery Act of 1976, the Toxic Substances Control Act of 1976, the Safe Drinking Water Act, and the Noise Control Act are exempt from NEPA.[147]

As a result, while policies and laws based on integrated perspectives did exist, they were swamped by a confluence of policies and politics. Those policies and politics, as we have seen, included dissatisfaction with New Deal administration, incrementalism, the competition for environmental credit between President Nixon and Senators Muskie and Jackson, rivalry between congressional committees, and the preference of bureaucrats for programmatic administration.

III. An Integrated Approach

A. Towards a Concept of Integration

The sheer magnitude and complexity of an integrated analysis does pose serious problems for its practical application. Lindblom has an important point to make in his criticism of the rational model of administration when pointing out that a comprehensive evaluation of how a given decision might affect all other decisions can be quite unrealistic.[148] The need to be realistic affords one good reason for distinguishing environmental integration from economic models of decision-making and regulatory reform that are based upon comprehensive studies of all risks.[149] This still leaves us with questions about the principles upon which an integrated approach should proceed.

This section will discuss the frameworks within which an integrated approach could be structured. The reference to an integrated approach to pollution control should not obscure the fact that a multitude of forms are implied by such an approach. An integrated approach can be applied in a myriad of ways and assume a variety of patterns. The principles of an integrated approach lend themselves to diverse combinations and permutations that can be applied in variegated cir-

145. Clean Water Act of 1977, 33 U.S.C. § 1371(c)(1) (1982).

146. 15 U.S.C. § 793(c)(1) (1982).

147. 44 Fed. Reg. 64,174 (1979).

148. Lindblom, *Muddling*, *supra* note 91; Pfiffner, *Administrative Rationality*, 20 Pub. Admin. Rev. 125 (1960). *See also supra* text accompanying notes 91-94.

149. *See infra* text accompanying notes 178-221.

cumstances. The manner and form of integration could, therefore, differ from case to case.

1. STRATEGIC PRINCIPLES

The first principle underlying an integrated approach is that pollution control should be based upon an holistic, rather than a discrete or segmented, view of the environment. The environment should not be artificially divided into separate areas of air, water and land. A necessary corollary of this premise is that administrative structures dealing with environmental protection should be capable of dealing with the environment as a whole.[150]

Secondly, an integrated approach requires that the major deficiencies of a fragmented approach be corrected. Both inputs and final products must be considered, and systematic environmental assessments should be made across all three media—a "longitudinal" analysis. Finally, cross-media pollution controls based on integrated analysis should be adopted.[151] These principles appear attractive and worthy of praise. They could be accepted and acclaimed rather like motherhood and blueberry pie. The real difficulty lies in applying them. While the exact manner of their application is beyond the compass of this Article, an appreciation of the core problem of implementation will be considered in this discussion.

2. COMPARATIVE LESSONS

The environment in which we live cannot be encapsulated within national boundaries. The bio-physical problems caused by pollution in different parts of the world are often identical and can resist independent national solutions. An exposure to, and a study of, comparative experiences may shed light on possible solutions.[152] The difficulties encountered by fragmented controls figure significantly among the shared environmental problems of the international community. A transnational perspective offers a vantage point from which to gain some impression of how others perceive the problems arising out of fragmented controls, as well as the nature of any integrated responses to those

150. NATIONAL ACADEMY OF PUBLIC ADMINISTRATION, STEPS TOWARD A STABLE FUTURE 5, 7, 15, 17 (1986) [hereinafter STABLE FUTURE].

151. *See supra*, Diagram A.

152. While problems found in other areas of law such as tort, contract, administration, property, corporations and criminal law have varying degrees of similarity and encourage comparative inquiry, the unique, obvious and inescapable commonality of environmental problems make comparisons between environmental regimes in different countries a more rewarding subject of study. For the international dimensions of cross-media pollution, see Teclaff & Teclaff, *International Control of Cross-Media Pollution—An Ecosystems Approach*, 27 NAT. RES. J. 21 (1987).

problems. In addition to the United Kingdom,[153] the Commission of the European Communities,[154] Sweden[155] and the Netherlands[156] have taken some steps towards integrated pollution controls.

The United Kingdom has a long history of pollution control legislation. This legislation initially dealt with public health[157] and now boasts an extensive corpus of laws, policies, and agencies spanning land use planning and the control of pollution in general.[158] These laws and

153. *See infra* text accompanying notes 157-64.

154. *Resolution on the Continuation and Implementaion of an Action Programme For The Period 1987-1992*, 30 O.J. EUR. COMM. No.C. 289 3 (1987) (resolution of the Council of the European Communities adopted October 19, 1987). The text of the Action Programme is found in Commission of the European Communities, *Draft for a Resolution of the Fourth Action Programme*, 30 O.J. EUR. COMM. NO.C. 70 3-45 (1987) [hereinafter *Action Programme*]. Action programs are the instruments by which the Commission of the European Communities outlines its legislative intentions. There have been four such programs in the last 15 years, and they provide a policy framework within which European Community environmental laws will be made. They are not legislative schedules, but incorporate broad formulations of policy. Not all the policies set out in action programs are the subject of legislation. These action programs, nonetheless, offer good evidence of the direction of European Community policy and law. *See* N. HAIGH, EEC ENVIRONMENTAL POLICY AND BRITAIN 9-11 (2d ed. 1987).

155. In Sweden, the Environment Protection Act of 1969 laid the foundations for cross-media pollution control by providing that pollution should be controlled at its source. This act replaced the existing sectoral control by providing that pollution "from land, buildings or installations," whether it be caused by water, air or land or take the form of noise, should come within its jurisdiction. The authority to grant permits to major polluting sources is placed in the hands of the National Franchise Board. One permit covers discharges to air, water and land. In deciding what the permissible limits of pollution should be, Sweden does not rely upon predetermined standards, whether they be ambient or source related, but on the best practicable technological means. Even though major pollutants are regulated according to the environmental medium of release, each waste stream is ultimately assessed according to its contribution to the totality of pollution. Hinrichson, *Integrated Permitting and Inspection in Sweden* (ch. 7), in INTEGRATED POLLUTION CONTROL IN EUROPE AND NORTH AMERICA, *supra* note 123.

156. The Netherlands boasts of a comprehensive body of environmental law and policy which is being adapted to incorporate a cross-media approach. Prior to 1984, a permit system operated in the differing media, and the granting of permits was influenced by broad policy declarations called "indicative multi-year programmes." By the late 1970s, the limitations inherent in dividing environmental protection into separate compartments became clear, and work began on transforming the entire system into an integrated regime. In order to effect this transformation, much of the existing legislation will be superseded by a broad framework act, granting power to control pollution at the source. Law and policy under the framework act, together with strategic and operational plans and environmental impact assessments, will constitute the foundations for cross-media pollution control. The structure of environmental administration which is built along single medium lines will, however, remain unchanged. *See* J. DE GRAFFE & J. POLACK, THE LAW AND PRACTICE RELATING TO POLLUTION CONTROL IN THE NETHERLANDS (1977); Bennett, *Policy Planning in the Netherlands* (ch. 6), in INTEGRATED POLLUTION CONTROL IN EUROPE AND NORTH AMERICA, *supra* note 123.

157. The legislation is at least traceable to the Benthamite-inspired reforms of Chadwick during the middle of the nineteenth century. *See, e.g.*, the Public Health Acts, 1848, 1872 and 1875. *See also* Dicey, *The Debt of Collectivism to Benthamism*, in LAW AND PUBLIC OPINION IN ENGLAND (2d ed. 1962).

158. The legal regime controlling water pollution will soon change (in 1989) with the privatization of the Regional Water Authorities. Some changes in air pollution law may also take place to bring the law of the United Kingdom into harmony with European Community law.

policies, together with the bureaucracies created by them, are encompassed within a legal and political tradition characterized by pragmatism and incrementalism. Legislation has in general attempted to locate, contain and control the diverse problems of pollution within just one of the media of land, air or water, with apparent disregard of cross-media implications.

The concept of integration was introduced to the United Kingdom by the Royal Commission on Environmental Pollution (RCEP) in 1973.[159] Initially, the RCEP addressed only questions of cross-media pollution and argued that pollution or wastes generated by an industrial activity could potentially affect water and land, as well as air. In deciding where pollution should occur, it was sensible that the form and medium of disposal of pollution should be such as to cause the least environmental damage overall. A new integrating concept was mooted. Decisions should be aimed at securing the best practicable environmental option (BPEO). Such an approach, however, did not find support in law or administration.[160] The RCEP recommended the creation of a new, unified inspectorate that would undertake an integrated approach to difficult industrial problems. The RCEP returned to the theme of BPEO in its tenth and eleventh reports.[161] In its twelfth report,[162] it

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What is being described in this note is the present law. In brief, serious (usually noncombustible) air pollution is controlled under the Health and Safety at Work Act of 1974, together with the Alkali etc. Works Regulation Act of 1906. Less serious pollution (usually combustible) is governed by the Clean Air Acts of 1956 and 1968. Emissions from motor vehicles come within the purview of the Road Traffic Act of 1972, and the sulfur content of oil fuel used in furnaces is restricted by the Control of Pollution Act of 1974. Prior to the establishment of Her Majesty's Inspectorate of Pollution (HMIP) in 1987, the administration of the laws dealing with serious air pollution was vested in Her Majesty's Industrial Air Pollution Inspectorate (HMIAPI); they have now been absorbed into HMIP. Noncombustible sources continue to be regulated by local authorities. Water pollution is regulated under the Control of Pollution Act of 1974 (COPA). This act is administered by statutorily created regional water authorities. The disposal of waste on land is controlled under the Control of Pollution Act of 1974 and is administered by waste disposal authorities. The Radioactive Substances Act controls use and disposal of radioactive waste. It was administered and enforced by a separate inspectorate, now absorbed into HMIP. Commercial nuclear installations are governed by the Nuclear Installations Act of 1965 and the Nuclear Installations Inspectorate. Planning controls under the Town and Country Planning Act of 1971 are carried out by local planning authorities. *See* THE CONTROL OF POLLUTION ENCYCLOPEDIA (J. Garner ed. 1976 & Supp. 1989); ENCYCLOPEDIA OF PLANNING LAW AND PRACTICE (D. Heap ed. 1982 & Supp. 1988); J. MCLOUGHLIN & M. FORSTER, THE LAW AND PRACTICE RELATING TO POLLUTION CONTROL IN THE UNITED KINGDOM (2d ed. 1982); U.K. DEP'T ENV'T, POLLUTION PAPER NO. 9, CONTROL OF POLLUTION IN THE UNITED KINGDOM: HOW IT WORKS (1978); A. WALKER, LAW OF INDUSTRIAL POLLUTION CONTROL (1980); A. WISDOM, THE LAW OF RIVERS AND WATERCOURSES (4th ed. 1979).

159. RCEP, No. 5, *supra* note 1. The RCEP is a prestigious, permanent, national, bipartisan body which was appointed in 1971 to advise the government of the United Kingdom on questions of environmental pollution. It has made 12 reports to date, and many of its recommendations have been adopted.

160. *Id.* at ¶ 264 (by the government of the day).

161. RCEP, Nos. 10 & 11, *supra* note 1.

162. RCEP, No. 12, *supra* note 1.

widened the scope of recommended integration. The concern with cross-media pollution and industrial process was enlarged in principle to include products, inputs, strategic planning and even national and international policy.[163] The extent to which BPEOs should include wider strategic considerations was not specified. The recommendations of the RCEP have been only partially adopted by the British government.[164]

3. THE INTEGRATIVE COMPASS

For our purposes, the British formulation of an integrated approach (BPEO) raises two important and interconnected questions that need to be restated before the concept of integration can be satisfactorily implemented. The first concerns the meaning of integration.[165] It is one thing to accept the principle of cross-media pollution, but altogether another to define it. While accepting BPEO in principle, the United Kingdom made no legislative attempt to define the concept. The second question, which to a considerable degree subsumes the first, involves the application of the principle. As a concept that seeks to address the source rather than the effects of pollution, it is possible to conceive of integration as extending from treatment and process to products, and even to grand strategic decisionmaking.

Diagram A[166] illustrates the problem. Suppose that the plant and process (a point source) consists of a coal burning electric generator, and that the generator discharges unacceptable levels of sulphur dioxide. The plant management proposes to implement flue gas desulphurization to deal with the problem. One of the desulphurization technologies envisaged is the application of pulverized limestone which

163. *Id.* at ¶¶ 2.15, 3.3.

164. After first rejecting it, the Thatcher government in 1987 accepted the proposal for an unified inspectorate of pollution and named it Her Majesty's Inspectorate of Pollution (HMIP). HMIP, however, does not encompass all existing inspectorates and is not based upon a fresh legislative mandate. U.K. DEP'T ENV'T, HER MAJESTY'S INSPECTORATE OF POLLUTION (1987). It was superimposed upon the existing statutory overlay and brought together HMIAPI, the Radiochemical and Hazardous Waste inspectorates, but did not embrace the environmental functions of the Ministry of Agriculture, Fisheries and Food, the Health and Safety at Work Executive, or the Department of Energy. Neither does HMIP include certain other inspectorates. Most importantly, it has hardly any control over water pollution. *See also* RCEP, No. 12, *supra* note 1, at ¶ 4.6. Furthermore, HMIP is structured around the separate inspectorates that it has absorbed. This lack of integration was EPA's problem. The RCEP points out, with characteristic British understatement, "current experience of a multi-media approach to pollution control is limited." *Id.* at ¶ 4.7.

165. This is almost a universal question. For instance, the Commission of the European Community, which accepts the need for an integrated approach to pollution control in certain circumstances, is confronting the difficulties of formulating a concept that could be applied to achieve its goal. *Action Programme*, *supra* note 154, at 3.4.4.

166. *See supra* Diagram A.

results in the creation of gypsum-rich sludge waste. Large quantities of such waste are envisaged. How might the concept of integration be applied in such a situation? At the strictly operational level, an integrated approach would accept the fact of such residuals or wastes, and seek to find the optimal balance for disposing of them, whether to air, land or water, by the use of a coordinated permit. An extended version of the approach would evaluate the decision to undertake flue gas desulphurization within a broader context. Such an inquiry would involve an investigation of the environmental effects of limestone quarrying. What effect would this have on the area from which it is removed, particularly if limestone is found, say, in a national park? In England, it is found in areas designated as being of "outstanding natural beauty." Furthermore, what are the effects of transporting limestone across the rural countryside, and what are the environmental consequences of having to store limestone in large quantities? Finally, what is the environmental impact of disposing of the sludge created by this particular technology?

After assessing the environmental impact of the proposed changes, this version of integration would consider whether a case could be made for a different method of desulphurization based on an alternative technology. Although the British government favors the narrow operational approach, the RCEP seems to favor a broader approach.[167] Integration arguably should go further and consider the broader socioeconomic question as to the acceptability of coal fired generators and to balance this against alternative power sources, such as nuclear, solar or wind. Alternatively, it could be asked if generators are necessary at all, when better energy conservation would reduce the need for electric energy.[168] This line of thinking could be extended much further. Most human activities result in the creation of residuals or wastes, and most social and economic activities could, therefore, have environmental and ecological repercussions. From this perspective, anything less than comprehensive planning which totally integrates environmental factors into the decisionmaking and which is based upon environmental considerations, would be inadequate.[169]

The case for an integrated environmental resource strategy has been cogently argued in the *World Conservation Strategy* (WCS).[170]

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167. U.K. DEP'T ENV'T, *supra* note 164; RCEP, No. 12, *supra* note 1, at ¶ 2.1.

168. This was the argument in Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc., 435 U.S. 519 (1978).

169. *See* J. FORRESTER, WORLD DYNAMICS 123-28 (1981); Norton, *Towards a Concept of Strategic Resource Planning*, 4 INT'L J. OF ENVTL. STUD. 189 (1973).

170. International Union for Conservation of Nature and Natural Resources-United Nations Environment Programme-World Wildlife Fund, *World Conservation Strategy*, in 23 INTERNATIONAL PROTECTION OF THE ENVIRONMENT (B. Ruster & B. Simms eds. 1981).

Put starkly, WCS warns that an increasing pollution burden, together with the depletion of vital natural resources and the destruction of critical ecosystems, cannot continue unabated. It argues that further development and progress will depend on how society faces up to the frightening fact that natural resources and ecological processes are being appropriated for consumption at the same time that they are being damaged by pollution resulting from the burden of residuals. Any satisfactory answer to these problems can only be found within the parameters of a strategy which seeks (1) to manage and conserve natural resources so as to extend and prolong their life cycle, (2) to preserve ecosystems and genetic diversity, and (3) to minimize the impact of pollutants and wastes. The WCS reasons that all of these undertakings should form part of an integrated strategy.

4. PRACTICAL APPLICATION

It is essential that difficulties about scope and definition, real though they be, should not be allowed to deflect and delay the implementation of an integrated approach. The question that confronts us at this stage is how to arrive at a starting point from which integrated decisionmaking can commence. What constitutes a sensible beginning when confronted with so complicated a problem? Since the seemingly obvious starting points of air, water or land have been rejected, from where does one start? In applying the principles discussed, there is no definitive and preordained point from which to begin, but a promising response is offered by the Conservation Foundation's Draft Environmental Protection Act.[171] The Second Draft divides the sources of pollution into mobile sources, point sources, nonpoint sources and substances and articles. Point sources include the plant and process capable of producing air, water and solid waste pollution which may hitherto have been treated separately under air, water and solid waste laws. For heuristic purposes, point sources offer a good starting point for testing the practicability and applicability of an integrated analysis. First, the point sources could be divided according to type of plant—steel and rolling mills, pulp and paper mills, sugar cane extracting mills, etc. Second, a single permit would be issued for each such point source. This single coordinated permit contrasts with the present practice of issuing different permits for air, water and solid waste. In setting standards, EPA would abide by those standards already established under present

171. CONSERVATION FOUNDATION, THE ENVIRONMENTAL PROTECTION ACT, SECOND DRAFT (1988) [hereinafter SECOND DRAFT]. This *Second Draft* is cited for a very limited purpose. It should be distinguished from the *Draft Act* discussed *infra* at text accompanying notes 279-99.

legislation, and then try to ensure a balance that would secure the best practicable environmental option.

The RCEP has proposed an insightful and instructive "procedure" for the practical implementation of an integrated approach. This "procedure" will be adapted and developed, as a functional approach, in the analysis that follows. The advantage of a functional approach to integration is that it begins with a proposed activity and allows an integrative analysis to be pursued as far as the investigator wants to go. The integrative bubble placed around the activity can be confined to a point source. On the other hand, it could be extended to product and input, and even further to strategic planning and macro socioeconomic policy.

The analysis starts by focusing on the objective of an activity. Since the objective of most industrial activities is the production of goods, it seems sensible to begin with the nature of the final product and raise questions about possible alternatives that might be less polluting. For example, if the activity is coal-fired generation of electricity, questions may be raised about the options to the generation of extra electricity. Does a need for more electricity actually exist where better insulation and more careful use of energy could achieve savings equivalent to the electricity that is to be generated? If the activity is the manufacture of bright paper that causes considerable pollution, the option of manufacturing less bright, non-bleached paper which causes much less pollution should be considered. An obvious constraint that arises in this context is the extent to which pollution control laws allow for inquiries of this kind. If the laws do not, attention would shift to the controlling of process and inputs.

A further objective of an industrial plant or process is the disposal of the residuals. Such an objective is formulated in the light of, and within the limits laid down by legal, technical and economic factors. It is important that further analysis of the objectives pertaining to the method of disposal precede any final decision. For example, where residuals consisting of heavy metals, or sludge from crude oil tanks, need to be disposed of, the objective would be to dispose of residuals in the most efficient manner within the law rather than to design, locate and operate a high-temperature incinerator. Such residuals could be disposed of on land or incinerated. A decision as to the method of disposal should depend upon the analysis being described. Such an analysis may reveal that incineration is the most satisfactory method of disposal, but this should not be prejudged.

The next stage lies in generating options. Such options would be subject to the existing laws controlling pollution. They would arise from the canvassing of technologies, plant designs and methods which create the most environmental benefit at the least cost. For example, the

most efficient answer to pollution caused by the generation of liquid residuals containing mercury in the chlor-alkali industry does not lie in the use of end-of-pipe technologies that attempt to remove the mercury from waste water. Instead, it is found in employing a different method of production—a diaphragm, rather than a mercury cell, in the manufacturing process.[172]

The third stage involves an environmental impact assessment of a short list of options generated by stages one and two. There is a rich history of experience, literature and case law on section 102(2)(c) of NEPA[173] setting out the requirements of environmental impact evaluations, but these will not be replicated here. What is important for the purposes of this discussion is that any environmental impact assessment should take the cross-media pollution transfers into account. The nature of cross-media transfers has already been discussed.[174]

During the fourth stage, ways of reducing the environmental impact of the short list of options will be considered. They will involve a consideration, inter alia, of (1) the importance of inputs,[175] (2) the possibilities of reclamation of residuals and recycling,[176] and (3) changes to production process in order to reduce waste.[177] Finally, an overall

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172. RCEP, No. 12, *supra* note 1, at ¶ 3.8.

173. 42 U.S.C. § 4332(2)(C) (1982). *See* COUNCIL ON ENVIRONMENTAL QUALITY, ENVIRONMENTAL IMPACT ASSESSMENTS: AN ANALYSIS OF 6 YEARS EXPERIENCE BY SEVENTY FEDERAL AGENCIES (1976); COUNCIL ON ENVIRONMENTAL QUALITY, ENVIRONMENTAL QUALITY-1981 (1982); F. ANDERSON, NEPA IN THE COURTS (1973); W. RODGERS, *supra* note 7, at 697-834; J. BATTLE, ENVIRONMENTAL DECISIONMAKING AND NEPA (1986).

174. *See supra* notes 1-50 and accompanying text.

175. This aspect of the matter has already been referred to in the context of the coal electric industry. *See supra* notes 34-35 and accompanying text. The same holds true in many other activities, for example, the steel industry, where the use of raw coke plant liquor causes significant problems of air pollution. A. KNEESE & B. BOWER, *supra* note 26, at 93.

176. The British were fortunate in discovering the virtues of recycling. When the first Alkali Act was enacted in 1863, hydrogen chloride was being emitted into the atmosphere and was causing extensive damage to the countryside. It was found that hydrogen chloride could be converted into commercial bleach. Polluton control was thereby achieved while the industry was steered into a profitable venture. Hill, *The Role of the British Alkali and Clean Air Inspectorate in Air Pollution Control*, in INTERNATIONAL COMPARISONS IN IMPLEMENTING POLLUTION LAWS 89 (1983). United States industrial history also presents numerous examples of successful by-product development from reclaimed residuals. A few of these include the transformation of slaughterhouse residuals into valuable raw material for the pharmaceutical industry, the developments of silvi-chemicals based upon materials contained in wood pulping residuals, the production of animal foods from brewery, distillery and food processing residuals, the use of power plant residuals of ash in building materials, the use of textile residuals in paper manufacture, and the production of farm fertilizer from ammonium chloride. Similarly, materials in finished goods have been re-cycled. They include the recovery of lead from batteries, the re-cycling of beer and soda cans, and, to some degree, the recycling of virtually all metals. Some of these developments are summarized in A. KNEESE & B. BOWER, *supra* note 26, at 45-48; RCEP, No. 12, *supra* note 1, at ¶ 3.11.

177. For example, in steel production, the basic oxygen process results in more than twice as many particulates per ton as the open hearth and electric arc processes, while also generating more residuals in general. The introduction of continuous casting on a broad scale will result in a decrease of residuals. A. KNEESE & B. BOWER, *supra* note 26, at 85-92.

evaluation of the options is undertaken, and the one best befitting an integrated approach is adopted. The same analysis can be extended to cover input and strategic planning.

B. Integration and Regulatory Reform

To the extent that integrated thinking converges with the criticism of "command and control"[178] regulation by "regulatory reformers,"[179] it may be prudent at this juncture to point out that an adventitious convergence of views does not lead to any confluence of conclusions. The indictment of the present system of "command and control" legislation by regulatory reformers is familiar. It has been argued with skill and cogency by eminent scholars such as Bruce Ackerman, Stephen Breyer and Richard Stewart.[180] This Article does not propose to

178. Stewart, *Regulation, Innovation and Administrative Law: A Conceptual Framework*, 69 CALIF. L. REV. 1256, 1264 (1981) (describing "command and control" legislation as that which requires or proscribes specific conduct by regulated firms; this is contrasted with a system of regulation based on economic incentives and price mechanisms).

179. The parent stock of economic analysis has given rise to two interrelated theories, one doctrinaire, the other pragmatic. The doctrinaire theorists of deregulation argue first that no regulatory process can ever be responsive enough to replicate the efficiency of the market, and second that, in any event, efficient regulation is impossible because regulatory agencies are colonized by those who pursue their self interest. These doctrinaire theorists conclude, therefore, that administrative regulation is either completely ineffective or a waste of resources, and they call for deregulation, the abolition of agencies, and a return to the market. *See* Stigler and Friedland, *What Can Regulators Regulate? The Case of Electricity*, 5 J.L. & ECON. 1 (1962); Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. & MGMT. SCI. 3 (1971); G. STIGLER & M. COHEN, CAN REGULATORY AGENCIES PROTECT THE CONSUMER? 1-17 (1971); M. DERTHICK & P. QUIRK, THE POLITICS OF DEREGULATION 9 (1985). The more pragmatic regulatory reformers (*e.g.*, S. BREYER, REGULATION AND ITS REFORM 15-35 (1982)) concede that the unregulated price of goods does not reflect the true cost to society of producing their goods. The difference between true social costs and unregulated price arises, for example, when a manufacturer makes use of the air or water to get rid of residuals, thereby causing harm to others, without paying for the use of such air or water. While problems of this kind may theoretically be dealt with through private liability rules, the difficulties and drawbacks of such a scheme have elicited the concession that centralized and specialized administrative direction may be necessary in dealing with problems of environmental pollution. But such regulation should be market supporting rather than market supplanting. Winter, *Economic Regulation and Competition: Ralph Nader and Creeping Capitalism*, 82 YALE L.J. 890 (1973). The goal of regulation should be to correct market failure and formulate agency rules which mimic, as far as possible, the allocation of goods and services that would be produced in a perfectly competitive market. For an excellent resume and critique of the arguments based on deregulation and regulatory reform, see Stewart, *The Reformation of American Administrative Law*, 88 HARV. L. REV. 1669, 1689-93, 1702-11 (1975). *See also* Hirshman, *Postmodern Jurisprudence and the Problem of Administrative Discretion*, 82 NW. U.L. REV. 646, 646-55 (1988); Sunstein, *supra* note 76, at 446-52.

180. *See* Stewart, *supra* note 178, at 1264; Breyer, *Analyzing Regulatory Failure: Mismatches, Less Restrictive Alternatives and Reform*, 92 HARV. L. REV. 547, 595-97 (1979); B. ACKERMAN, S. ROSE-ACKERMAN, J. SAWYER & D. HENDERSON, THE UNCERTAIN SEARCH FOR ENVIRONMENTAL QUALITY 165-207 (1974) [hereinafter UNCERTAIN SEARCH]; Rose-Ackerman, *Market Models for Water Pollution Control: Their Strengths and Weaknesses*, 25 PUB. POL'Y 383 (1977); R. CRANDALL, CONTROLLING INDUSTRIAL POLLUTION: THE ECONOMICS AND POLITICS OF CLEAN AIR 32-80 (1983); T. TIETENBERG, EMISSIONS TRADING: AN EXERCISE IN REFORMING POLLUTION POLICY

review their arguments or those advanced in defense of the present regime in any detailed or systematic fashion. However, a quick distillation of the central themes of their argument is necessary to demonstrate that the case for integration is distinct from and independent of the case made by the regulatory reformers.

To begin with, regulatory reformers often adopt arguments based on an economic analysis which would have the effect of relaxing the present controls and allowing market forces to play a key role in environmental policy.[181] Those arguments contend that the present controls impose billions of dollars in compliance costs[182] and lead to decreases in productivity, technological innovation and market competition.[183] They argue that the present uniform standards governing pollution do not achieve environmental protection at the lowest cost. Some polluters may have lower abatement costs than others because of their technological superiority or their favorable physical and geographical location. These polluters should contribute more towards achieving a required environmental quality because they could do so at the least cost. Uniform emission standards apply indiscriminately across the board and do not differentiate between varying cost capabilities. Therefore, these standards cannot achieve the desired levels of environmental protection at the lowest cost.[184] Further, such standards do not consider the true social cost of environmental legislation. The true social costs will include not only the costs involved in installation, maintenance and management of pollution controls, but also the "opportunity costs" incurred in not deploying the resources required for pollution control in other profitable ventures such as streamlining the plant or extending it. Any opportunities for such beneficial investment are forgone as a result of having to set up pollution controls.[185] Finally, the regulatory reformers fail to provide incentives to improve antipollution devices. Where a polluter has complied with existing controls, she has no incentive to further reduce pollution. Indeed, it would be against her interest to try to do any better. The cure for these deficiencies, urge the regulatory reformers, lies in more flexible strategies which would achieve environmental protection on a lowest cost basis and at the same time provide adequate incentives for improved performance. They also

(1985) (providing bibliographies at the end of each chapter). The development of the reformist critique is traced in ENVIRONMENTAL POLICY UNDER REAGAN'S EXECUTIVE ORDER 1-40 (V. Smith ed. 1984); B. ACKERMAN & W. HASSLER, *supra* notc 50.

181. *See* Stewart, *supra* note 178.

182. *See* A. KNEESE & C. SCHULTZE, *supra* note 50, at 69-84.

183. *See, e.g., id.* at 59-60, 81-82; S. BREYER, REGULATION AND ITS REFORM 115-16, 269-70 (1982); Stewart, *supra* note 178, at 1259-60, 1279-1306.

184. *See* S. BREYER, *supra* notc 183, at 264; *see also* A. KNEESE & C. SCHULTZE, *supra* note 50.

185. *See* UNCERTAIN SEARCH, *supra* note 180.

urge a system of environmental protection based upon charges and marketable permits.[186] Such strategies would require paying attention to the particular circumstances of the polluter and adopting a "fine tuning" approach to regulation.[187]

It is indeed difficult to read the criticisms and proposals of these reformers without being impressed by the extent to which their views coalesce with those of the Reagan Administration, which was intent on deregulating and dismantling environmental controls. Many of these critics propose reforming methodologies which involve a quantification of the costs and benefits of proposed action. It is precisely such an approach that President Reagan's executive orders formalized by requiring a cost-benefit analysis to the extent permitted by law.[188] This Article adopts the positions taken in an impressive and important rejoinder to the regulatory reformers by Professor Howard Latin. He points out that after Congress proved unwilling to repeal regulatory legislation, the Reagan Administration changed tack and argued for a strategy which was substantially the same as that of the regulatory reformers. Premised on the grounds of efficiency, that strategy included "fine tuning" and expanded reliance on cost-benefit analysis.[189] Latin warned that the Administration was well aware that "fine tuning" would seldom work in practice and used "fine tuning" as a means to achieve sub rosa deregulation. He also demonstrates that the reformers' excessive preoccupation with ideal or theoretical efficiency blinds them to the truth that in a "second best" world, the critical issue is not ideal efficiency but actual effectiveness.[190] It is worth mentioning in this context that the uniform national standards presently applicable to air and water were adopted only after the more flexible and relaxed approach to pollution control proved ineffective.[191]

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186. J. BONINE & T. MCGARITY, THE LAW OF ENVIRONMENTAL PROTECTION 637-38 (1984).

187. Stewart, *supra* note 178, at 1266.

188. Exec. Order No. 12,291, 3 C.F.R. 127 (1982), *reprinted in* 5 U.S.C. § 601 app. at 431-34 (1982); Exec. Order No. 12,498, 3 C.F.R. 323 (1986), *reprinted in* 5 U.S.C. § 601 app. at 138-39 (Supp. V 1985).

189. *See* Latin, *Ideal Versus Real Regulatory Efficiency: Implementation of Uniform Standards and "Fine Tuning" Regulatory Reforms*, 37 STAN. L. REV. 1267, 1271-72 (1985).

190. *Id.*

191. For example, the statutory regimes of national air pollution control carried over from the Air Pollution Control Act of 1955 to the Air Quality Act of 1967 left the control of air pollution in state hands. The Air Pollution Control Act of 1955, Pub. L. No. 84-159, 69 Stat. 322 (1955), declared that air pollution control responsibility rested primarily with the states. The federal role was confined to research. The Clean Air Act of 1963, Pub. L. No. 88-206, 77 Stat. 392 (1963), declared that its aim was to achieve the prevention and control of air pollution, but left it virtually to the states to determine what the nature and content of such control should be. Federal intervention was possible only where air pollution resulted in interstate consequences (*id.* § 5 (f)), and required complicated conference procedures (*id.* § 5), together with a court order based upon physical and economic feasibility (*id.* § 5 (g)). The 1963 act left pollution control in state hands.

The regulatory reformers are, therefore, seeking to turn the clock back and return to the discredited and demonstrably ineffective kinds of controls that have been supplanted. Moreover, the bureaucratic quagmire that would be created by any scheme of charges or transferable pollution rights has been clearly demonstrated.[192]

A central theme common to a number of the reformer proposals[193] appears to coalesce with one which lies at the heart of cross-media pollution control. The regulatory reformers contend that decisionmakers should consider *all* economic, environmental and control strategies before devising an efficient system. In order to arrive at the optimal solution to any environmental problem, they argue, it is necessary to obtain full information about *all* environmental, economic and social circumstances, together with full consideration of all possible strategies.[194] Latin points out that this may be feasible in an ideal world, but not in the real "second best" world we inhabit. Obtaining such information involves both time and money, and time is not something readily available when there is a need for expeditious action. In many environmental situations, the consequences of postponing action until all information becomes available could be very damaging. Risk assessment is notoriously difficult, and postponing a decision or making no decision for the reason that the issue is indeterminate promotes interests which benefit polluters.[195] In many cases, the kind of evaluation demanded by these reformers is a prescription for procrastination. Interrelated to their call for full information and investigation is the demand for more rigorous risk assessment. They require not only that a particular pollutant be linked with specified harm or injury, but also

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The Air Quality Act of 1967, Pub. L. No. 90-148, 81 Stat. 485 (1967), probably represents the kind of regime favored by the regulatory reformers. It provided, inter alia, for HEW to create atmospheric areas and air quality regions (*id.* §§ 107 (a)(1) & 107 (a)(2)) and to issue criteria documents and reports on pollution control techniques (*id.* § 107 (b) & (c)). It then required states to adopt ambient air standards consistent with the criteria and control technique reports (*id.* § 108 (c)(1)). The nature or scope of such standards was not specified. States were then expected to develop plans to implement the ambient air quality standards. Such plans would contain emission standards and timetables for compliance (*id.* §§ 107 & 108).

Such a statutory scheme gave ample opportunity for market forces and fine tuning. But they just did not work. The verdict on these efforts is aptly summarized by Rodgers. ". . .[T]hey were tried and found wanting. . . ." W. RODGERS, *supra* note 5, at 245. *See also* R. Melnick, *supra* note 2, at 28; R. TOBIN, *supra* note 7; J. DAVIES & B. DAVIES, THE POLITICS OF POLLUTION (1975). It was precisely because of the failure of these earlier legislative schemes that Congress resorted to national ambient air quality standards under the Clean Air Act amendments of 1970 and 1977. Clean Air Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (1970); Clean Air Amendments of 1977, Pub. L. No. 95-95, 91 Stat. 685 (1977). *See also Should NEPA Apply*, *supra* note 101, at 623.

192. Wolozin, *The Economics of Air Pollution: Central Problems*, 33 LAW & CONTEMP. PROB. 227, 233-37 (1968).

193. B. ACKERMAN & W. HASSLER, *supra* note 50, at 72-73.

194. *Id.* at 60-103; UNCERTAIN SEARCH, *supra* note 180, at 9-78.

195. Latin, *Good Science, Bad Regulation, and Toxic Risk Assessment*, 5 YALE J. ON REG. 89, 92 (1988).

that particular levels of the implicated pollutant be correlated with marginal environmental and health effects.[196] This kind of risk assessment is a Gargantuan task requiring almost limitless time and resources. It is almost incapable of fulfillment in a "second best" world.[197]

The regulation of pollutants confronts at least four types of uncertainty which stand in the way of scientific certainty or proof.[198] They are data uncertainty,[199] indeterminacy,[200] nonrecurring and nonrepli-

196. *See, e.g.*, R. STEWART & J. KRIER, *supra* note 29, at 360-61; L. LAVE & E. SESKIN, AIR POLLUTION AND HUMAN HEALTH (1978); V. SMITH, THE ECONOMIC CONSEQUENCES OF AIR POLLUTION 174 (1976). In their rejoinder to Latin's article, Ackerman and Stewart claim that they "have never advocated such an utopian scheme." They go on to propose that Congress, and not administrators, should specify the rates of reduction, in percentile terms, of existing pollutants. They admit that this would require Congress to "guess about countless contestable matters." Ackerman & Stewart, *supra* note 100, at 1352-55. It is difficult to see how guessing by Congress, which does not possess any special expertise in these matters, could be preferred to that of EPA, which would be in a far superior position to undertake such a task. The crux of the matter is that the reformers object to the "unguided" decisions of EPA precisely because they are not based upon sufficient information and satisfactory risk evaluation. That criticism is clearly blunted by their admission that the decisions they would now leave to Congress would be equally "unguided." Specialized agencies were created because Congress lacked the kind of expertise demanded to implement the reformers proposals. Indeed, Stewart himself has questioned whether "a legislature is likely in many instances to generate more responsible decisions on questions of policy than agencies," arguing that while administrative agencies have been criticized as unduly responsive to wealth and to organized interests, such criticisms might equally be applied to Congress. Stewart, *supra* note 179, at 1696. The position now taken by Ackerman and Stewart is a major concession to the impracticability of the kind of risk evaluation they espouse.

197. Latin, *supra* note 189, at 1274; Gamse, *Economic Analysis and Environmental Regulations*, in ECONOMIC EFFECTS OF GOVERNMENT MANDATED COSTS 134-36 (R. Lanzillotti ed. 1978).

198. *See* Rodgers, *Guerilla Decisionmaking: Judicial Review of Risk Assessments*, 15 J. HAZARDOUS MATERIALS 205, 206-10 (1987) (Rogers describing the four types of uncertainty).

199. The decisionmaker lacks the facts to make a considered decision. The data shortages include unknowns about groups exposed, routes of exposure, patterns and practices of uses, behavior of chemicals within the environment, and their effects on human beings.

200. Indeterminacy arises out of attempts to answer questions that have no answer. Indeterminate questions include the shape of the dose-response curve, the relevance of animal studies, the relationship of exposures to effects observed in epidemiological studies, and even whether there are safe threshold levels for exposures to given substances. For example, EPA has stated that no reliable threshold above zero can be identified for carcinogenic risk. National Emission Standards for Hazardous Air Pollutants; Policy and Procedure for Identifying, Assessing and Regulating Airborne Substances Posing a Risk of Cancer, 44 Fed. Reg. 58,642, 58,660 (1979). And further, the agency has stated that "in every quantitative risk estimation . . . the results are uncertain." Guidelines for Carcinogenic Risk Assessment, 51 Fed. Reg. 33,992, 33,997 (1986). These conclusions flow from the fact that the causal relationship between a chemical and cancer is often difficult to establish, partly because of incomplete knowledge concerning the manner in which a chemical carcinogen acts on human cells and also because there is uncertainty as to whether the human body has some defensive mechanism against the carcinogenic reaction. Evidence of carcinogenesis in humans usually arises from epidemiological studies of occupational groups that have high exposure to a given chemical. However, extrapolations to the general public from this data are unreliable because humans are exposed to a variety of other substances at low levels. To try and overcome this difficulty, rodents are used in laboratory testing. Unfortunately, small risks are difficult to detect in rodents, and assumptions that the dose-response relationships in rodents apply equally to humans is fiercely contested. Because carcinogenic dose-response relationships cannot be directly determined at low exposure levels either by epidemiologic studies or studies on animals, numerous

cable events,[201] and transcientific policy questions.[202] Eventually, these uncertainties can be combatted only by policy choices[203] based upon the psychological, political and legal acceptability of a given risk,[204] rather than upon alleged scientific judgment. The fallacies behind the view that the risk-assessment process is a scientific activity have been strikingly and cogently exposed.[205] Latin has demonstrated how inadequate scientific knowledge and inadequate data usually prevent derivation of risk estimates based on reliable science, while the illusion that risk assessment is a purely scientific activity hides the political and policy judgments on which such risk assessment is based.[206] It is quite clear that an integrated approach does require some form of risk evaluation, but the crucial point that needs emphasis is that such risk evaluation is too important and too uncertain to be left exclusively to risk assessors who hide their policies and politics behind a facade of science.[207]

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mathematical models have been developed to extrapolate from high to low dosages. Alas, no single mathematical procedure is recognized as the most appropriate for low-dose extrapolation in carcinogenesis. *Id.*; Bond, *Causality of a Given Cancer After Known Radiation Exposure*, in HAZARDS: TECHNOLOGY AND FAIRNESS 24 (National Academy of Engineering 1986). *See generally* Latin, *The Significance of Toxic Health Risks: An Essay on Legal Decisionmaking Under Uncertainty*, 10 ECOLOGY L.Q. 339 (1982); Latin, *The Feasibility of Occupational Health Standards: An Essay on Legal Decisionmaking Under Uncertainty*, 78 NW. U.L. REV. 583 (1983); Latin, *supra* note 195; Note, *Toward Sensible Regulation of Hazardous Air Pollutants Under Section 112 of the Clean Air Act*, 63 N.Y.U. L. REV. 612 (1988).

201. Predicting nonrecurring events introduces us to the realm of the indeterminate. Apart from indeterminacies, there are information barriers unique to understanding events that come around but once. For example, the chemistry and impact of the mixtures at many of the waste disposal sites are not duplicable, and they leave in their wake unanswerable questions about causes and effects. *See generally* S. EPSTEIN, L. BROWN & C. POPE, HAZARDOUS WASTES IN AMERICA (1982).

202. These are high policy questions that may be asked of science, but are not answerable by science. *See* Weinberg, *Science and its Limits: The Regulator's Dilemma*, in HAZARDS: TECHNOLOGY AND FAIRNESS, *supra* note 200, at 9.

203. Latin, *supra* note 195, at 133-34.

204. Rodgers lists these controlling considerations as including voluntariness, catastrophic nature, comparability to natural risks, universality (e.g., the widespread dissemination of PCBs, DDT and lead), government sponsorship (e.g., swine flu), vulnerability of the target group, necessity (e.g., fluorocarbon), familiarity of the risk, and immediacy of anticipated effects and de minimis nature. He points out that these indicators may be in conflict at times, but they offer surprisingly convincing explanations of a number of well-known policy decisions. Rodgers, *supra* note 198, at 210.

205. Latin, *supra* note 195; Rodgers, *supra* note 198.

206. Latin, *supra* note 195, at 89-95.

207. *Id.* at 90. In what one hopes will not prove to be a regressive move, the Integrated Environmental Management Program (IEMP) of EPA has pioneered the use of quantitative risk analysis as an integrating methodology and has, according to Davis, "educated a large number of people about risk assessment and risk management." Davis, *The United States: Experimentation and Fragmentation* (ch. 3), in INTEGRATED POLLUTION CONTROL IN EUROPE AND NORTH AMERICA *supra* note 123. The kind of risk assessment ostensibly based on good science which estimates health hazards at varying exposure levels is now embodied in EPA's guidelines for estimating carcinogenic hazards. Guidelines for Carcinogen Risk Assessment, *supra* note 200. Risk assess-

Accordingly, the integrative analysis of risk advocated in this Article is intended to encourage and induce tighter and more effective environmental controls to remedy the defects of existing regimes. Since it is based on the premise that those controls already in place will remain intact, it is not a vehicle for avoiding or relaxing existing controls, though there is the possibility that the nature and wisdom of some of the existing controls may need to be reconsidered. The integrative analysis advocated here is based upon several grounds. First, the failure scientifically to find or prove an effect cannot lead to the conclusion that there is no effect.[208] Latin has pointed out, and Ackerman and Stewart have accepted,[209] that the costs of obtaining all relevant information about all possible effects of pollutants are prohibitive. Second, risk assessment is as much a political as a scientific evaluation.[210] The primary purpose of a regulatory agency is to achieve the goals set out in its statute, and an agency's mission should not be paralyzed by the complexities of scientific uncertainty. Latin points out that Congress has often recognized the uncertainty associated with toxic hazards and nonetheless required agencies to impose effective regulatory controls.[211] The position that "a 'political' agency law-making process is more functional and wise in the long run than a 'technocratic' process," and should therefore be preferred to the latter, has a well-established pedigree in administrative law.[212] Not surprisingly, the view that decisions made on the basis of public perception of risk, in the absence of quantifiable scientific proof, are not irrational has been gaining acceptance. It has been firmly endorsed by the British Royal Commission on Environmental Pollution.[213]

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ment is seen as anterior to and supposedly independent of the political activity of risk management which balances competing interests and values to determine whether identified toxic risks should be considered acceptable or tolerable.

208. Page, *A Generic View of Toxic Chemicals and Similar Risks*, 7 ECOLOGY L.Q. 207, 230-33 (1978).

209. *Supra* note 196.

210. *See supra* notes 198-207 and accompanying text. *See also* ROYAL SOCIETY, RISK ASSESSMENT (1983); Slovic, Fischoff & Lichtenstein, *Facts and Fears: Understanding Perceived Risk*, in SOCIETAL RISK ASSESSMENT: HOW SAFE IS SAFE ENOUGH? (R. Shilling & A. Albers eds. 1980); Otway, *The Perception of Technological Risks: A Psychological Perspective*, in TECHNOLOGICAL RISK (M. Dierkes, S. Edwards & R. Coppock eds. 1980); Otway & Thomas, *Reflection on Risk Perception and Policy*, in 2 RISK ANALYSIS 2 (1982); K. SHRADER-FRECHETTE, RISK ANALYSIS AND SCIENTIFIC METHOD (1985).

211. Latin, *The Significance of Toxic Health Risks*, *supra* note 200, at 381-82. For example, the Occupational Safety and Health Act's legislative history recorded that despite scientific uncertainty, "it is not intended that the Secretary be paralyzed by debate surrounding diverse medical opinions." SENATE COMM. ON LABOR AND PUBLIC WELFARE, LEGISLATIVE HEARING ON THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, at 848 (1971).

212. *See, e.g.*, A. BONFIELD, STATE ADMINISTRATIVE RULE MAKING 9 (1986).

213. RCEP, No. 10, *supra* note 1, at 11.

Unfortunately, the regulatory reformers and economic analysts have succeeded in stealing the mantle of "rationality." By giving decisionmakers supposedly objective numbers derived from markets, and a way of using them in cost-benefit analysis, the economic approach appears to be more rational than the subjective values or judgments of administrators.[214] This Article accepts the need to move from "incrementalism" to "comprehensive rationality,"[215] but rejects the view that such a development should be based upon economic analysis.[216] The "comprehensive rationality" advocated in these pages is premised upon the principle that the policymaker must promote only those goals specified by the politically responsible legislature.[217] The objective and purpose of administrative action is to realize these goals in a manner consistent with the publicly articulated purpose of the statute. It is not to re-balance them against the criteria of economic analysis, and emphatically not to substitute the goal of economic efficiency. A number of our environmental laws emphasize ethical over economic values insofar as they aim to protect health, safety and environmental quality, rather than to make markets more efficient or to maximize consumer surplus or social wealth.[218] Consistent with these views, "comprehensive rationality" is seen as the framework within which administrators should seek the public good as embodied in the goals of legislation.[219]

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214. For a useful analysis, see Rodgers, *Benefits, Costs and Risks: Oversight of Health and Environmental Decisionmaking*, 4 HARV. ENVTL. L. REV. 191 (1980).

215. Diver, *Policymaking Paradigms in Administrative Law*, 95 HARV. L. REV. 393, 396-99, 409-34 (1981).

216. *See infra* notes 368-72 and accompanying text.

217. Diver, *supra* note 215. *See also* B. CARDOZO, THE NATURE OF THE JUDICIAL PROCESS (1921) (judges should interpret statutes by starting with the language and reaching a decision that applies that language to a particular set of facts in a way consistent with the publicly articulated purpose of the statute; judges ought not to look beyond the legislature's stated purpose in interpreting statutes). Pari passu, the same principles should apply to administrators.

218. Stewart, *Regulation in a Liberal State: The Role of Non-Commodity Values*, 92 YALE L.J. 1537, 1566-90 (1983). According to Stewart, "[m]ost environmental statutes explicitly endorse the promotion of non-commodity values such as wilderness preservation and health protection." *Id.* at 1584. Stewart places his ideas within liberal theory that first asserts the equal right of each individual to pursue his or her own conception of the good, and second, affirms governmental neutrality, and bars government from using its power in a manner so as to advance some citizen's particular concept of the good. Stewart justifies the advancement of non-commodity environmental values on the grounds that liberalism recognizes the need to develop in individuals a critical capability with respect to their preferences that enables them to expand and enrich their existing concepts of the good. Such a critical capability, he argues, is central to the supreme value of individual self-determination; without it, one can hardly be said to choose one's own ends. *Id.* at 1567. He concludes that wealth maximization based on economic analysis is not consistent with liberal principles. "It is instead a form of tyranny that would impose on individuals a partial sectarian concept of the good. Liberal principles demand that regulation cultivate non-commodity values." *Id.* at 1569. *See also* Sagoff, *Where Ickes Went Right* or *Reason and Rationality in Environmental Law*, 14 ECOLOGY L.Q. 265, 272-73 (1987).

219. While it is not intended to canvass theories of administrative decisionmaking, some reference to them is unavoidable. The approach favored by this Article is based upon the "republi-

The goals embodied in legislation need not necessarily reflect or follow public concern and preference. The legislation can also create and lead public opinion. In so doing, legislation performs a "teaching" function.[220] Professor Joseph Sax highlights the educative role of law when he likens statutes protecting the environment to museums, libraries, public television and education which attempt to improve popular culture and taste.[221] Economic analysis seeks to subvert this teaching function of the law, but "comprehensive rationality" does not. Any move from a fractured and fragmented system to an integrated one should be wedded and faithful to the goals of Congress.

C. Integration Institutionalized

1. THE ECOLOGICAL ROOTS

An integrated approach to environmental problems is deeply embedded in ecological and 'holistic' pathways of thinking which view the environment as an integrated and interconnected whole. A rich vein of literature bears witness to this thinking.[222] It is illustrated forcefully by two books that had an enormous impact on the thinking of an earlier era. In 1962, Rachel Carson's *Silent Spring*[223] showed that pollution is more than an aesthetic problem and constitutes a threat to the complex processes of life. The book was premised upon an holistic understanding of the environment. More important, for the purposes of this discussion, Barry Commoner's apocalyptic *Closing Circle*, published in 1971, made the case for an holistic view of the "ecosphere" even more directly and powerfully. Indeed, his flrst law of ecology was that

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can" concept of administration and government. The "republican" theory of government argues that legislation should rise above "clashing interests and render them all subservient to the public good." THE FEDERALIST No. 10, at 57 (J. Madison) (S. Mittell ed. 1938). To this limited extent, the Article does not subscribe to "pluralist" theories of government, which support economic analysis. *See* Sunstein, *Interest Groups in American Public Law*, 38 STAN. L. REV. 29 (1985); Reich, *Public Administration and Public Deliberation: An Interpretive Essay*, 94 YALE. L.J. 1617 (1985). *See also infra* text accompanying notes 357-72.

220. W. BAGEHOT, THE ENGLISH CONSTITUTION 133 (2d ed. 1978).

221. J. SAX, MOUNTAINS WITHOUT HANDRAILS 50-52 (1980).

222. *See* E. KORMONDY, CONCEPTS OF ECOLOGY (2d ed. 1976); E. KORMONDY, READINGS IN ECOLOGY (1965); P. EHRLICH & J. HOLDREN, HUMAN ECOLOGY: PROBLEMS AND SOLUTIONS (1973); S. BRUBAKER, TO LIVE ON EARTH: MAN AND HIS ENVIORNMENT IN PERSPECTIVE (1972); C. PURCELL, FROM CONSERVATION TO ECOLOGY (1973); R. NASH, THE AMERICAN ENVIRONMENT: READINGS IN THE HISTORY OF CONSERVATION (1968); L. CALDWELL, ENVIRONMENT: A CHALLENGE TO MODERN SOCIETY (1970); L. CALDWELL, MAN AND HIS ENVIRONMENT: POLICY AND ADMINISTRATION (1975); AMERICA'S CHANGING ENVIRONMENT (R. Revelle & H. Landsberg eds. 1967); W. OPHULS, ECOLOGY AND THE POLITICS OF SCARCITY: PROLOGUE TO A POLITICAL THEORY OF THE STEADY STATE (1977).

223. R. CARSON, SILENT SPRING (1962).

"Everything is Connected to Everything Else,"[224] and his second was that "Everything Must Go Somewhere."[225] His illustration of these principles demonstrated the extent to which we are compelled to treat the environment as a whole and are barred from reducing it to "a set of separate simple events."[226] The ecological thinking of the era was complemented by those of various policy analysts. Allen Kneese, Blair Bower, and their colleagues, for instance, focused on the flow of materials from the environment to the economy and the return flow of these materials back to the environment as wastes or residuals. They developed a model to provide a comprehensive view of the environment and the economy and concluded that air, water and solid waste pollution could not be considered separate unrelated problems.[227]

The early influence of these ideas motivated legislative attempts, which began ten years before NEPA, to unify conservation, resource and environmental policy.[228] Then, in 1968, an important report of the Subcommittee on Science, Research, and Development of the House Committee on Science and Astronautics, entitled Managing the Environment, implicated fragmented governmental decisionmaking with the country's environmental problems and recommended that a national policy for the environment be adopted.[229] The need for integration was also reflected in the even more important Congressional White Paper on a National Policy for the Environment.[230]

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224. B. COMMONER, *supra* note 8, at 33.

225. *Id.* at 39.

226. *Id.* at 21. One of his examples is every bit as telling today.

> A dry-cell battery containing mercury is purchased, used to the point of exhaustion, and then 'thrown out'. But where does it really go? First it is placed in a container of rubbish; this is collected and taken to an incinerator. Here the mercury is heated; this produces mercury vapor which is emitted by the incinerator stack, and mercury vapor is toxic. The mercury vapor is carried by the wind, eventually brought to earth in rain or snow. Entering a mountain lake, let us say, the mercury condenses and sinks to the bottom. Here it is acted on by bacteria which convert it to methyl mercury. This is soluble and taken up by fish; since it is not metabolized, the mercury accumulates in the organs and flesh of fish. The fish is caught and eaten by a man and the mercury becomes deposited in his organs, where it might be harmful.

Id. at 40.

227. *See* A. FREEMAN, R. HAVEMEN & A. KNEESE, THE ECONOMICS OF ENVIRONMENTAL POLICY (1973); B. BOWER, G. LARSON, A. MICHAELS & W. PHILLIPS, WASTE MANAGEMENT: GENERATION AND DISPOSAL OF SOLID, LIQUID AND GASEOUS WASTE IN THE NEW YORK REGION, A REPORT OF THE SECOND REGIONAL PLAN (1968). This approach was more definitively set out in A. KNEESE & B. BOWER, *supra* note 26.

228. F. ANDERSON, NEPA IN THE COURTS 4 (1973).

229. HOUSE SUBCOMMITTEE ON SCIENCE, RESEARCH, AND DEVELOPMENT, 90th Cong., 2D Sess., MANAGING THE ENVIRONMENT (Comm. Print 1968).

230. SENATE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS AND THE HOUSE COMMITTEE ON SCIENCE AND ASTRONAUTICS, 90th Cong. 2D Sess., CONGRESSIONAL WHITE PAPER ON A NATIONAL POLICY FOR THE ENVIRONMENT (Comm. Print 1968).

2. THE NATIONAL ENVIRONMENTAL POLICY ACT[231]

NEPA was the outcome of two bills, one introduced in the House by Congressman John Dingell[232] and the other introduced in the Senate by the architect of NEPA, Senator Jackson.[233] Professor Lynton Caldwell acted as consultant for Jackson and his committee. The writings of both Jackson and Caldwell testify to their commitment to integration.[234] Jackson felt that the legislative responses to the environmental problems in the 1960s were sporadic and uncoordinated and that NEPA provided "both a conceptual basis and a legal sanction" for a more coordinated and systematic method of dealing with environmental problems.[235] He also noted that in order to produce a truly integrated and national environmental policy, bills had been introduced to establish a national environmental policy institute, a Department of Natural Resources, and a national land use policy.[236]

Unhappily, the legislative history of NEPA does not all point in the direction of integration. To begin with, although Jackson was clearly impressed with the need for integration, neither his bill[237] nor Dingell's bill[238] mentioned integrated environmental policies or even a national environmental policy. Apparently, both Jackson and Dingell were trying to avert a turf battle over committee jurisdiction. Jackson had to deal with Senator Muskie, chairman of the influential Subcommittee on Air and Water Pollution of the Senate Committee on Public Works, which sponsored air and water pollution legislation. For his part, Dingell had to contend with Congressman Wayne Aspinall, chairman of the House Interior and Insular Affairs Committee, who eventually emerged as one of NEPA's strongest opponents.[239]

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231. The tortuous journey involved before a bill becomes law, together with the various procedural steps referred to in parts of this Article, is succinctly discussed in W. KEEFE & M. OGUL, THE AMERICAN LEGISLATIVE PROCESS: CONGRESS AND THE STATES 35 (6th ed. 1985).

232. H.R. 6750, 91st Cong., 1st Sess., 45 CONG. REC. 3415 (1969).

233. S. 1075, 91st Cong., 1st Sess., 45 CONG. REC. 19,008 (1969).

234. In his book ENVIRONMENT: A CHALLENGE TO MODERN SOCIETY, Professor Caldwell has a section entitled "Environmental Management as Applied Science." L. CALDWELL, ENVIRONMENT: A CHALLENGE TO MODERN SOCIETY 163-232 (1970). In it, he argues that there had, until recently, been no perceived need for general or comprehensive policies of environmental administration and control, and that management had extended only to specific aspects of the environment. *Id.* at 163. He notes, however, that an ecologically based environmental policy should be characterized by comprehensiveness of policy and control and operative arrangements. Indeed, his whole book is premised upon the analogue of a "spaceship earth" which depends for its survival upon coordinated and interrelated systems.

235. Jackson, *Environmental Policy and the Congress*, 11 NAT. RES. J. 403, 407 (1971).

236. *Id.* at 411-13.

237. S. 1075, *supra* note 233.

238. H.R. 6750, *supra* note 232.

239. F. ANDERSON, *supra* note 228, at 5. *See also Should NEPA Apply*, *supra* note 101, at 600-02 (discussing NEPA's "nebulous legislative history" in contrast to its "clear statutory directive").

Important amendments made to the Senate bill during its hearings before Jackson's Committee on Interior and Insular Affairs reflect the politics encompassing the bill.[240] Some of the most significant amendments were made because of Caldwell's promptings.[241] These amendments incorporated the concept of environmental impact assessments.[242] For his part, Muskie succeeded in obtaining amendments before the Senate forwarded the bill to a conference committee. The apparent thrust of his amendments was to ensure that air and water standards set under legislation being drafted by his subcommittee, or falling within its jurisdiction, would not be affected by NEPA. Section 104 of NEPA sought to achieve Muskie's objectives.[243] It was ambiguously worded and did not plainly and clearly support Muskie's objective that air and water pollution legislation should be exempted from NEPA.[244] As Judge Leventhal concluded in *Portland Cement Ass'n v. Ruckelshaus*,[245] "[t]here is no express exemption in the language of the Act or Committee Reports."[246] An attempt to remedy this ambiguity had been made at the last minute when the conference report on NEPA reached the Senate floor. Jackson introduced a document interpreting the act into the Congressional Record to exempt environmentally protective federal activities from NEPA obligations.[247] That document stated that section 102[248] was aimed primarily at "those agencies who

240. In the House, the Subcommittee on Fisheries and Wildlife Conservation of the House Committee on Merchant Marine and Fisheries, reported out a "clean bill" which was practically identical to the original House bill. F. ANDERSON, *supra* note 228, at 6. *See also Environmental Quality: Hearings on H.R. 6750 et al., Before the Subcomm. on Fisheries and Wildlife Conservation of the House Comm. on Merchant Marine and Fisheries*, 91st Cong., 1st Sess. (1969).

241. F. ANDERSON, *supra* note 228, at 6. *See also* J. BONINE & T. MCGARITY, *supra* note 186, at 6-7.

242. Caldwell's testimony lead to inclusion of action-forcing provisions. The bill containing those provisoins was passed on July 10, 1969. F. ANDERSON, *supra* note 228, at 6 (citing 115 Cong. Rec. 19,008-13 (1969)).

243. National Environmental Policy Act of 1969, § 104, 42 U.S.C. § 4334 (1982). "Nothing in Section 102 or 103 shall in any way affect the specific statutory obligations of any Federal agency (1) to comply with criteria or standards of environmental quality, (2) to coordinate or consult with any other Federal or State agency, or (3) to act, or refrain from acting contingent upon the recommendations or certification of any other Federal or State agency."

244. *See* F. ANDERSON, *supra* note 228, at 8 (citing 115 CONG. REC. 29,046-63, 29,066-99, 40,923-28, 116 CONG. REC. 8984). *See also Should NEPA Apply*, *supra* note 101, at 600-02 (discussing NEPA's "nebulous legislative history" in contrast to its "clear statutory directive").

245. 486 F.2d 375, 381 (D.C. Cir. 1973).

246. *Id.* n.20 (citing S. REP. No. 296, 91st Cong., 1st Sess. (1969); H. REP. No. 765, 91st Cong., 1st Sess. (1969)).

247. F. ANDERSON, *supra* note 228, at 106. *See also* 115 CONG. REC. 40,417 (1969); Comment, *Landmark Decision on the National Environmental Policy Act in* Calvert Cliff's Coordinating Comm., Inc. v. Atomic Energy Comm'n, 1 ENVTL. L. REP. 10,125 (1971).

248. National Environmental Policy Act of 1969, § 102, 42 U.S.C. § 4332 (1982). Section 102 places a duty on *"all agencies of the Federal Government. . ."* (emphasis added) to prepare environmental impact statements in "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment."

now have little or no legislative authority to take environmental considerations into account,"[249] and that section 103[250] "is aimed at those agencies which have little or no authority to consider environmental values."[251] While this may have lent support to Muskie's views, the same document went on to say that section 102 was "clearly designed to assure consideration of environmental matters by all agencies in their planning and decision making."[252] Muskie, commenting on the statement introduced by Jackson, stated that the clear understanding between Jackson and himself was that sections 102 to 105 of NEPA did not change the legislative mandates of agencies having environmental protection duties.[253] Whatever the nature of this understanding between Jackson and Muskie, it was not formalized in any statement in the conference report, and as Senator Allott, a member of the Interior and Conference committees, said, "[O]nly the conference report itself was signed by all the Senate conferees, and therefore, only it was agreed upon and is binding."[254] In like vein, Judge Skelly Wright observed in *Calvert Cliffs Coordinating Comm. v. United States Atomic Energy Comm.*:[255]

> This rather meager legislative history, in our view, cannot radically transform the purport of the plain words of Section 104. Had the Senate sponsors fully intended to allow a total abdication of NEPA responsibilities in water quality matters-rather than a supplementing of them by strict obedience to the specific standards of Water Quality Improvement Act (WQIA)—the language of Section 104 could easily have been changed.[256]

Citing the United States Supreme Court, Judge Skelly Wright also stated that "the legislative history of a statute (particularly such relatively meager and vague history as we have here) cannot radically affect

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249. 115 CONG. REC. 40,418 (1969).

250. National Environmental Policy Act of 1969 § 103, 42 U.S.C. § 4333 (1982). Section 103 directs all agencies of the federal government to bring their policies and procedures into full compliance with NEPA.

251. 115 CONG. REC. 40,418 (1969).

252. *Id.* On a subsequent occasion when the amendments to the Federal Water Polluton Control Act were being debated, Jackson concluded that EPA should not be exempt from NEPA. 118 CONG. REC. 33,709 (1972).

253. 115 CONG. REC. 40,423 (1969).

254. *Id.* at 40,422.

255. 449 F.2d 1109 (D.C. Cir. 1971). In this case, petitioners argued that the Atomic Energy Commission (AEC) failed to consider environmental matters to the extent required by NEPA when the AEC had passed new rules. The AEC contended that the rules were within the broad scope of NEPA.

256. *Id.* at 1126.

its interpretation if the language of the statute is clear."[257] Indeed, section 102 states quite explicitly and unambiguously that it applies to "all agencies of the Federal Government."[258]

While it is not proposed to second guess their intentions, the interventions of Jackson and Muskie are perhaps best understood as an attempt to protect the "turf" of committee jurisdiction rather than an attempt to strike at the integrative functions of NEPA.[259] In any event, this legislative history, which was concerned and indeed was confined to the applicability of NEPA to air and water controls, could not have been directed at the then unborn EPA. When it was created, EPA clearly had an authority which extended beyond air and water.

3. THE ENVIRONMENTAL PROTECTION AGENCY

Six months after the enactment of NEPA, President Nixon established two new agencies by executive order. They were EPA[260] and the National Oceanic and Atmospheric Administration (NOAA).[261] In establishing the two agencies, President Nixon made the case for controlling cross-media pollution in a persuasive, succinct and cogent manner. The notion of comprehensive management and integration clearly undergirded the creation of EPA and was based upon the ecological ideas and concepts referred to above.[262] President Nixon observed that since

257. *Id.*

258. National Environmental Policy Act of 1969 § 102(2), 42 U.S.C. § 4332(2) (1982).

259. *See supra* notes 95-115 and accompanying text.

260. For text of plan, see MESSAGE FROM THE PRESIDENT OF THE U.S., REORGANIZATION PLAN No. 3, H.R. Misc. Doc. No. 364, 91st Cong., 2d Sess. (1970). The five major programs moved to EPA were (1) water pollution, which had formerly been carried out by the Federal Water Pollution Control Administration in the Interior Department; (2) air pollution, formerly executed by the National Air Pollution Control Administration in HEW; (3) solid waste management, drinking water quality and radiological health, also from HEW; (4) pesticides regulation and research from the Food and Drug Administration and the Agriculture Department; and (5) ambient standard setting for radiation from the Atomic Energy Commission. FIRST ANNUAL REPORT, *supra* note 28, at 25.

261. For the text of the plan, see MESSAGE OF THE PRESIDENT OF THE U.S., REORGANIZATION PLAN NO. 4, H.R. MISC. DOC. No. 365, 91st Cong., 2d Sess. (1970). For further information on the reorganization plans, see MESSAGE FROM THE PRESIDENT OF THE UNITED STATES, RELATIVE TO REORGANIZATION PLANS 3 and 4 of 1970, H.R. Misc. Doc. No. 366, 91st Cong., 2d Sess. (1970); COMMITTEE ON GOVERNMENT OPERATIONS, APPROVING REORGANIZATION PLAN NO. 3 OF 1970, H.R. REP. No. 1464, 91st Cong., 2d Sess. (1970); COMMITTEE ON GOVERNMENT OPERATIONS, APPROVING REORGANIZATION PLAN No. 4 OF 1970, 91st Cong., 2d Sess. (1970); *Reorganization Plans Nos. 3 and 4 of 1970, Hearings Before Subcomm. on Executive Reorganization and Government Research*, 91st Cong., 2d Sess. (1970).

262. *See supra* text accompanying notes 222-30. While Nixon's commitment to environmental protection may be open to some doubt, it seems reasonably clear that his approach towards integration was consistent with his beliefs. He believed that government should be organized around functions (overriding existing divisions) rather than around programs (based on existing sectoral legislation). His Administration made efforts to coordinate programs in a number of policy areas. *See* Palmer, *The Evolution of Grant Policies*, in THE CHANGING POLITICS OF FED-

environmental problems should be "perceived as a single, interrelated system," the then existing piecemeal federal efforts were inappropriate.[263] A consolidation of anti-pollution activities into one agency, therefore, "would help assure that we do not create new environmental problems in the process of controlling existing ones."[264] He hoped that by combining under one roof programs previously housed in several separate agencies, the government would be able to "mount an effectively coordinated campaign against environmental degradation in all of its many forms."[265] Furthermore, President Nixon noted that

> despite its complexity, for pollution control purposes the environment must be perceived as a single interrelated system. . . . A single source may pollute the air with smoke and chemicals, the land with solid wastes, and a river or lake with chemicals and other wastes. Control of the air pollution may produce more solid wastes which then pollute the land or water. Control of the water-polluting effluent may convert it into solid wastes which must be disposed of on land. . . . A far more effective approach to pollution control would: [i]dentify pollutants; [t]race them through the entire ecological chain, observing and recording changes in form as they occur; [d]etermine the total exposure of man and his environment; [e]xamine interactions among forms of pollution; and [i]dentify where in the ecological chain interdiction would be most appropriate.[266]

He returned to this theme in his first report to Congress on the state of the nation's environment, stressing how the setting up of EPA would consolidate the fragmented responsibilities of various pollution control agencies. He emphasized again that "[a]ir pollution, water pollution and solid wastes are different forms of a single problem" and that it was

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ERAL GRANTS 5, 24-25 (L. Brown, K. Palmer & J. Fosset eds. 1984); Whitaker, *Striking a Balance; Environment and Natural Resource Policy*, in THE NIXON-FORD YEARS 46 (1976). *See also* B. RABE, *supra* note 1, at 15.

Moreover, during congressional hearings on NEPA, Nixon had issued an executive order establishing an interagency Council on Environmental Quality, which had broad responsibilities for coordinating federal environmental policy. *See* Exec. Order No. 11,472, 34 Fed. Reg. 8693 (1969), *amended by*, Exec. Order No. 11,514, 35 Fed. Reg. 4247 (1970); Exec. Order No. 12,007, 42 Fed. Reg. 42,839 (1977), *reprinted in* 42 U.S.C. § 4321, app. at 507 (1982). Alfred Marcus has concluded that the Nixon Administration's commitment to administrative integration was in fact based upon ecological thinking. A. MARCUS, *supra* note 52, at 31-32.

263. Environmental Protection Agency and National Oceanic and Atmospheric Administration, The President's Message to the Congress Upon Transmitting Reorganization Plans to Establish the Two Agencies, July 9, 1970, 6 WEEKLY COMP. PRES. DOC. 908 (JULY 13, 1970).

264. *Id.* at 911.

265. *Id.* at 912.

266. Message of the President Relative to Reorganization Plans Nos. 3 and 4 of 1970, July 9, 1970, *reprinted in* FIRST ANNUAL REPORT, *supra* note 28, at 295.

evident that a different approach was necessary. He felt that reorganization under EPA together with the Council on Environmental Quality (CEQ), which the President charged with coordinating all environmental quality programs,[267] would now make this possible.[268]

Unfortunately, as we have seen,[269] EPA has not lived up to its expectations. It has not yet become an integrated agency, remaining half programmatic and half functional, and has been unable to adopt or implement an integrated approach.

IV. The Next Steps

We see an emerging picture in which promising integrative initiatives have been smothered by a variety of forces. The reasons for the dominance of fragmentation over integration, as we have noted,[270] included disillusionment with administrative expertise and management that gave rise to rule-specific statutes such as the Clean Air Act and the Clean Water Act. We also observed the perceived need to act quickly and effectively when confronted with an urgent problem without waiting for more comprehensive analysis, together with congressional and presidential politics, and bureaucratic and organizational difficulties. Despite these difficulties, the need for an integrated approach has become unquestionably stronger in light of the environmental problems confronting us. Not surprisingly, a number of influential and concerned voices have been calling for an integrated approach.

Integrated controls have been advocated by academic commentators,[271] governmental organizations, non-governmental organizations and even by EPA. The Council on Environmental Quality, which was established by NEPA to develop and advise the president on national environmental policy[272] and to oversee federal action subject to NEPA,[273] has advocated the concept in recent reports. In a 1983 report, CEQ stated: "Perhaps the most disturbing weakness of the environmental programs of the 1970s was their piecemeal approach to environmental protection, an approach that failed to recognize that the environment, by definition, is an integrated whole that must be pro-

267. The CEQ also stressed the need for integration and coordination in its first report. *Id.* at 24-27.

268. *Id.* at viii.

269. *See supra* text accompanying notes 116-47.

270. *See supra* Part II.

271. *See* Rehbinder & Stewart, *Environmental Protection Policy*, in 2 Integration Through Law 1-13 (M. Cappelletti, M. Seccombe & J. Weiler eds. 1985); B. Rabe, *supra* note 1. General support from a different analytical perspective and with different objectives from those being offered in this Article, is found among a wide variety of writers sharing an economic perspective. *See supra* note 180.

272. National Environmental Policy Act of 1969, § 204(1), 42 U.S.C. § 4344(1) (1982).

273. *Id.* §§ 202, 204(3), 42 U.S.C. §§ 4342, 4344(3).

tected comprehensively."[274] A later CEQ report reiterated the theme that "[a]ll parts of the environment are in some way connected, and it follows that the control of pollution should be integrated across program and disciplinary lines, so as to increase the efficiency of control from a whole-environment perspective and to prevent the unwanted transfer of pollutants from medium to medium." [275] In the course of formulating a basis for a more effective and efficient environmental policy, the first principle adopted by CEQ was that "[e]nvironmental protection policy must recognize the interconnectedness of the environment and emphasize multimedia approaches to pollution control."[276]

EPA, too, has begun to move towards an integrated approach.[277] The immediate past administrator, Lee Thomas, expressed his commitment to the concept unequivocally:

> Surely that is what is needed. Surely that is what environmentalists want. If the Environmental Protection Agency is ever going to live up to its name in the fullest sense, if it is ever

274. COUNCIL ON ENVIRONMENTAL QUALITY, 14TH ANNUAL REPORT OF THE COUNCIL ON ENVIRONMENTAL QUALITY 7 (1983).

275. COUNCIL ON ENVIRONMENTAL QUALITY, 16TH ANNUAL REPORT OF THE COUNCIL ON ENVIRONMENTAL QUALITY 12 (1985).

276. *Id.* at 20.

277. The first significant step in the direction of integration was taken in 1978 when Administrator Costle appointed a "Task Force on EPA Permits Consolidation." The Task Force cryptically accepted that its long range and ultimate goal was that of "regulating pollutants of concern through all phases of air, water and solid waste cycles," but concluded that such a task was beyond its seope. C. Sellars, The Rise and Fall of the Consolidated Permit Program—A Case Study of Reform Within the EPA (1984) (unpublished paper submitted to the Conservation Foundation). Costle's initiative led to a consolidated permit program that was later deconsolidated by the Reagan Administration. Administrator Costle took a second step in 1980 when he created a new Integrated Environmental Management Program (IEMP) in the Office of Policy Planning and Evaluation. In mid-1981, IEMP submitted a report to the new Administrator, Anne Gorsuch. Anne Gorsuch is notorious for her virulent anti-regulatory position. Taking over what was generally recognized as a comparatively efficient organization in May, 1981, she departed EPA in 1983 after an acrimonious tenure, leaving EPA, in the words of incoming Administrator Ruckelshaus, "on the verge of spinning out of control." Davies, *Environmental Institutions and the Reagan Administration* in ENVIRONMENTAL POLICY IN THE 1980S: REAGAN'S NEW AGENDA 143-60 (N. Vig & M. Kraft eds. 1984). The IEMP report recommended the institutionalization of toxics integration. The report was rejected by Gorsuch, and IEMP lay moribund until the end of 1982. It was then resurrected to undertake integrated studies of pollution control applicable to particular industries and particular geographic areas. The industry studies produced a "few interesting results" but for the most part failed to change EPA policy. The geographic studies are still ongoing. The focus of these studies is no longer to change the way EPA thinks so much as to educate state and local pollution control officials. A relatively new stimulus to an integrated approach was provided in the mid 1980s by the focus on waste reduction, and in 1988 EPA established an Office of Pollution Prevention separated from existing media programs. It is too early to evaluate the effect of this office on an integrated approach to pollution control. *See generally* Davis, *The United States: Experiment and Fragmentation*, in INTEGRATED POLLUTION CONTROL IN EUROPE AND NORTH AMERICA, *supra* note 123. *See also* Alm, *The EPA's Approach to Cross-media Problems*, in NEW PERSPECTIVES, *supra* note 1, at 7-13 (1985) (discussing proceedings of a conference held at Washington, D.C., Nov. 13, 1984).

> going to become more than a holding company for single medium programs, we are going to have to re-examine the roots of environmental policy.[278]

The appointment of William Reilly as administrator of EPA by President Bush may indicate a striking new development for that agency. Reilly is the immediate past president of the Conservation Foundation, whose proposal for an integrated environmental act may assume even greater significance. This section will first consider the Conservation Foundation proposal and then moot a different, less ambitious, but arguably more practical strategy for implementing an integrated approach.

A. The Conservation Foundation Proposal

The Conservation Foundation has been prominent among nongovernmental, environmental organizations in making a case for cross-media pollution control.[279] It has occupied the vanguard in the move towards environmental integration and, together with other commentators,[280] believes that the objective of integration should be embodied in new legislation. Pursuant to a cooperative agreement,[281] the Conservation Foundation has submitted to EPA the final draft of an Environmental Integration and Information Act (Draft Act).[282] The Draft Act,

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278. Letter from Conservation Foundation to Hank Schilling of EPA (Mar. 13, 1987) (accompanying the final draft of the Environmental Integration and Reformation Act).

279. *See supra* note 1. The Conservation Foundation has also drafted an "Environmental Integration and Information Act" aimed at encouraging program integration, research and monitoring, and is presently drafting another more comprehensive "Environmental Protection Act" which is intended to be an integrated pollution control law. These two draft statutes are research tools which examine and probe the opportunities and problems of a more integrated approach to pollution control. Conservative Foundation, News Release (Feb. 10, 1988). A second draft of the "Environmental Protection Act" (Second Draft) has just become available. Unfortunately, it cannot be considered in any detail. The Conservation Foundation is also engaged in a third project on "Integrated Pollution Control in Europe and North America," the purpose of which is to provide an opportunity for Europeans and North Americans to build a common understanding of the nature of the cross-media problem. *Id.*

280. *See* A. MARCUS, *supra* note 52, at XV; NATIONAL RESEARCH COUNCIL, PERSPECTIVES ON TECHNICAL INFORMATION FOR ENVIRONMENTAL PROTECTION (1977). STABLE FUTURE, *supra* note 150, at 5 (1984).

281. *See* Letter, *supra* note 278.

282. *Id.* The Draft Act (to be distinguished from the Second Draft referred to in notes 171 and 279) is being treated as a proposal for new legislation and not as a codification of ideas, though there is some ambivalence about it. The Letter, *supra* note 278, states that "the goal of the project was not to draft legislation per se but rather to generate ideas, explore problems, and suggest solutions." EPA is exploring the extent to which the ideas contained in the integration bill could be implemented administratively. *Id.* Despite this assertion, it is clear that the Draft Act is being presented as prospective legislation. It is difficult to explain why else the Draft Act should propose to repeal existing legislation and urge the creation of another new statutory body (the National Commission on Environmental Strategy) in section 801 of the Draft Act. Furthermore, the obligation to carry out cross-media pollution control is set out in new provisions, and are not derived

and the ideas embodied in it, are important and merit scrutiny for a number of reasons. To begin with, the Draft Act represents the distilled conclusions of an organization which, more than any other, has labored to advance the concept of cross-media pollution. Secondly, it has attracted the serious attention of EPA and consequently could point to new directions in environmental thinking. Finally, it may actually form the basis for new legislation if the reasoning adopted by it gains currency.

Although there is an unquestionable need for integrating norms that will countervail the effect of the existing norms of fragmentation, the quest of the Conservation Foundation for new legislation is misconceived and futile. It is futile because the difficulties in the way of new legislation are almost insurmountable. It is misconceived because countervailing norms are to be found in existing legislation.

1. NEW LEGISLATION

The difficulties in enacting new legislation are truly formidable.[283] Interest groups seeking legislation need to have access either to the executive or to subcommittees. While lawmaking and policymaking may no longer be confined to closed networks or "iron triangles" between congressional subcommittees, executive agencies and outside clientele groups, the difficulties of breaking into the system are formidable. A bill needs a sponsor, and getting sponsorship for the Draft Act can be problematic[284] as congressmen and senators hear a bewildering array of lobbyists and face a confusion of voices.[285] Even where a sponsor is found, the conservatism and caution of the legislature makes progress very problematic. Congress is ". . . devoted inordinately to the prevention of action [and is] . . . so well equipped to stop legislation. . . ."[286] And what it does not stop, it alters. Compromise is the order of the day.

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from existing legislation. *Id.*; Draft Act § 401(a) & (b). In fact, the Draft Act clearly aspires to be more than a statement of ideas. This is further borne out by the Conservation Foundation's strong aversion to the complexity of existing law. They assert that "the environmental statutes have become so detailed and complex that neither Congress nor EPA any longer understands what the total approach to environmental protection is." Letter, *supra* note 278, at 2.

283. W. KEEFE & M. OGUL, *supra* note 231, at 1-36; D. LOCKARD, THE PERVERTED PRIORITIES OF AMERICAN POLITICS 123-67 (1971); W. ESKRIDGE & P. FRICKEY, LEGISLATION 1-36 (1987). *See supra* notes 95-115 and accompanying text.

284. One State Department liaison officer is said to have observed that "It used to be that all one had to do was to contact the chairman and a few ranking members of a committee, now all 435 members and 100 senators have to be contacted." Davidson, *supra* note 97, at 130 (citing D. Mulhollan & A. Stevens, Congressional Liaison and the Rise of Informal Groups in Congress (1979) (unpublished manuscript presented at the 1979 annual meeting of the Western Political Science Association).

285. *Id.* at 128-31.

286. D. LOCKARD, *supra* note 283, at 123.

Any proposal for legislation requires major and marginal compromise in caucus, in committee, on the floor, and in negotiations with the executive.[287]

Subcommittees are the leading initiators and drafters of legislative measures and reports; thus if the Draft Act is to succeed, it needs to emanate from a subcommittee.[288] There are to date, at least thirty subcommittees exercising jurisdiction over environmental statutes.[289] Subcommittee power extends beyond drafting initial legislation and embraces amendments. Consequently, bills are drafted in a manner that calls for referral to specific committees and subcommittees.

Any legislation seeking overall integration is bound to fail as it runs the gauntlet of the committee system. Because it will impinge on the territories of at least thirty committees, a bill based on the Draft Act cannot succeed. Such an integration bill may be referred to a hostile committee and quietly pigeonholed, or it may never be placed on a committee agenda because of the chairperson's opposition. Or, having passed through a standing committee, the bill may fail to win clearance from the rules committee and thereby be lost. Even if placed on the calendar, it may never be called for consideration. Finally, it may be killed by recommitting it to committee for further study or emasculated by an amendment which alters its purposes.[290] The history surrounding both NEPA and EPA only reaffirms the high likelihood of failure. Even if the Conservation Foundation's proposals go forward in their present form, there is every possibility that they will emerge out of the legislative process in unrecognizable form.[291] Moreover, there is the danger of stirring up a hornets nest of opposition to integration within Congress. Given the importance of subcommittee jurisdiction and power, attempts at new legislation may succeed only in aborting any move to implement integration through the administrative process. Any effort to introduce new legislation is therefore misconceived.

2. COUNTERVAILING NORMS

A move to introduce fresh legislation needs to be examined from another perspective. The Conservation Foundation has quite justifiably complained about the byzantine complexity and uncertainty of the existing statutory maze. This complexity phenomenon is not a new one, and, in fact, is endemic to any corpus of law dealing with a complex

287. W. KEEFE & M. OGUL, *supra* note 231, at 15-16.

288. Davidson, *supra* note 97, at 114.

289. Kenski & Kenski, *Congress Against the President: The Struggle Over the Environment*, in ENVIRONMENTAL POLICY IN THE 1980s, *supra* note 277, at 111.

290. W. KEEFE & M. OGUL, *supra* note 231, at 6.

291. W. ESKRIDGE & P. FRICKEY, *supra* note 283, at 237.

subject.[292] The settled path of reform lies in ascertaining the defects of the existing system before prescribing what should be. Jurisprudential lineage to such a line of thinking can be traced to Jeremy Bentham, who pointed out that before the law could be reformed by legislation, the nature and shortcomings of the existing law needed to be described and identified. Before legislation is attempted, therefore, it is customary to grapple with the complexities of the existing law to determine just what its defects might be.[293] To rush to legislation, without first discovering the relevant attributes of existing law, may prove to be a fruitless pursuit.[294]

The heart of the Draft Act's objective lies in a two-sided provision. One side states that the regulating agency shall consider all significant health and environmental effects of its actions, especially if such effects may affect the ability of other agencies to fulfill their goals. The other side states that no action shall be taken by the agency to control one type of environmental hazard if such action is likely to lead to more than offsetting damage from cross-media transfers.[295] The controlling impact of this provision is offset by a different section which provides that no action taken by the agency should delay the deadlines established in any statute.[296]

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292. A committee consisting of the most eminent and illustrious lawyers of the day was set up to address precisely this issue in 1923. In their first report, which recommended the creation of an American Law Institute (ALI) which could respond to this challenge, they stated: "Two chief defects in American Law are its uncertainty and its complexity. These defects cause useless litigation . . . and when litigation is begun, create delay and expense." *Proceedings*, 1 A.L.I. 6 (1923). These difficulties were typically experienced in the common law, but they also arose out of "conflicting and badly drawn statutory provisions." The problems encountered in statute law were enumerated to include lack of clarity in language, lack of agreement or clear statement of principles, doubts as to whether prior statutes are repealed, collateral applications of specific provisions, and the possible application of the provisions of the statute to conditions wholly apart from those which gave rise to the demand for legislation. *Id.* at 69. While the ALI, in general, rejected new codification as a solution to the problem, preferring instead "restatements" of the law, they did prepare a draft code to resolve some of the complexities arising out of tax laws. *See* ALI, Federal Income, Estate and Gift Tax Statute (Tent. Draft No. 9, 1954); *see also* Goodrich, *The Story of the American Law Institute*, 1951 WASH. U.L.Q. 283 (1951). Such restatements and draft statutes are based upon the fundamental premise that law as it "is" should be determined before proceeding to what the law "ought" to be.

293. Bentham called the description of the legal system as it is, "expository" jurisprudence, and the criticism of the law in terms of its ends, "censorial" jurisprudence or the "art of legislation." H. HART & J. BURNS, AN INTRODUCTION TO THE PRINCIPLES OF MORALS AND LEGISLATION 293-95 (1970).

294. Duplication and re-enactment of existing concepts could well be the final result. Curiously, the Conservation Foundation has not even made a preliminary examination of the existing statutory regime.

295. *See supra* note 278 (Draft Act § 401(a), (b)).

296. *Id.* (Draft Act § 401(d)). The Administrator of EPA is further authorized to approve up to 10 demonstration projects to show the advantages of taking a more integrated approach to dealing with environmental problems and to test methods for implementing more integrated approaches. He or she is authorized to exempt these demonstration projects from all or any parts of

B. Integration Through Existing Legislation

The Conservation Foundation's proposal to use integrating goals to counter the sectoral and single medium goals of existing legislation has substantial merit. The argument of this paper is that such goals can be reached through existing legislation. The rightful call in this situation is for an exhaustive and definitive analysis of every statutory provision dealing with pollution control to ascertain if any of these permit or authorize integration. It would then be necessary to ascertain the extent to which these provisions could be woven together to form a pattern of law, policy and administration supporting an integrated approach. Such an endeavor is beyond the scope of this Article. As an example, however, this Article will present a preliminary analysis arising from a synoptic view of the existing statutory regimes by dealing with the control of chemicals, which present the greatest contemporary danger.[297] An aerial view of the present statutory landscape spanning chemicals offers one good example of a statute, the Toxic Substances Control Act of 1976 (TSCA), that takes an integrated approach. There are, of course, other statutes dealing with the control of toxic substances,[298] but TSCA is being chosen for analysis because of its special attributes.[299] When meshed with the integrating principles already institutionalized by NEPA and EPA, TSCA presents a viable baseline from which to move towards the administrative implementation of an integrated approach. Even provisions of statutes such as the Clean Air Act could be telescoped into TSCA and, consequently, strengthen an integrated approach. An eagle's view of the broad sweep of statutes should be the prelude to a painstaking 'fly's eye' scrutiny of all relevant statutes. What is now being attempted represents no more than a first step towards such a comprehensive analysis.

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any statute. *Id.* (Draft Act § 402(e)). The Draft Act also contemplates repealing a cluster of provisions in existing pollution legislation dealing with research and grants for research. *Id.* (Draft Act § 605). Finally, it contemplates the setting up of a National Commission on Environmental Strategy, a sunset commission, with a lifetime of no more than three years, to draw up a unified national strategic environmental plan. *Id.* (Draft Act § 801).

297. COUNCIL FOR ENVIRONMENTAL QUALITY, *supra* note 275, at 12-13; B. RABE, *supra* note 1, at 3-22, 143-62.

298. *See* Federal Insecticide, Fungicide, and Rodenticide Act of 1972, Pub. L. No .92-516, 86 Stat. 973, 7 U.S.C. §§ 136-136y (1982); Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6991i (1982); Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. §§ 9601-9675 (1982); Clean Air Act, § 112, 42 U.S.C. 7412 (1982); Clean Water Act § 307, 33 U.S.C. § 1317 (1982).

299. *See infra* notes 300-51 and accompanying text.

1. THE TOXIC SUBSTANCES CONTROL ACT OF 1976[300]

In 1971, President Nixon submitted to Congress a bill which sought to integrate the ways in which toxic substances were controlled. CEQ, which had researched and drafted the bill, set out their reasoning and conclusions in an influential report on toxic substances.[301] The report argued that most toxic substances do not exclusively pollute air or water, they are found in varying quantities in air, water, soil, food and industrial and consumer products. The multiplicity of ways by which society is exposed to toxics makes it difficult for the media-oriented authorities to consider the *total* exposure of an individual to a given substance, a consideration necessary for the establishment of adequate environmental standards. In terms of human health, the *total* exposure of a human being to a given substance from all parts of environment—air, water and food—must be considered. Furthermore, the interaction of these substances both within and outside the body must be evaluated. Similar consideration must be given to other living organisms. Since no agency had considered itself completely responsible for all such substances in all media, CEQ recommended that a new legal authority, EPA, should take over that function.[302]

The Toxic Substances Control Act (TSCA) was passed in 1976. Its passage was marked by disagreements between the House and Senate.[303] What is important for the purposes of this Article is that the disagreement between House and Senate did not turn on the need for or relevance of integration; that seemed to be a given.[304] In fact, on the key provisions broadly deflning the "environment,"[305] there was no disagreement.[306] Nor were there any significant differences on the need for the collection of information that would reveal the total exposure to a chemical and would monitor its total effect on health and environ-

300. 15 U.S.C. §§ 2601-2654 (1982) [hereinafter TSCA].

301. COUNCIL ON ENVIRONMENTAL QUALITY, TOXIC SUBSTANCES (1971).

302. *Id.* at v-vi.

303. H.R. REP. No. 1341, 94th Cong., 2d Sess., at 7-8 (1976). *See* HOUSE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE, LEGISLATIVE HISTORY OF THE TOXIC SUBSTANCES CONTROL ACT (Comm. Print 1976) [hereinafter LEGISLATIVE HISTORY]; R. DRULEY & G. ORDWAY, THE TOXIC SUBSTANCES CONTROL ACT 9-26 (1981); Gaynor, *The Toxic Substances Control Act:A Regulatory Morass* 30 VAND. L. REV. 1149, 1149-52 (1977); R. FINDLEY & D. FARBER, ENVIRONMENTAL LAW 445 (2d ed. 1985).

304. The Senate favored a restrictive approach to the marketing of chemicals based upon preregistration similar to that contained in the Federal Insecticide, Fungicide and Rodenticide Act. The House desired that all new chemicals be marketed without notification or registration, unless the EPA administrator had already placed such new chemicals on a "black list." The compromise eventually reflected in TSCA rejects a rigid preregistration regulatory scheme found in pesticide and drug laws, and favors a system of notice and selective interdiction. *See* W. RODGERS, *supra* note 5, at 898-901.

305. TSCA, § 3(5), 15 U.S.C. § 2602(5) (1982).

306. R. DRULEY & G. ORDWAY, *supra* note 303, at 9-25.

ment.[307] There was also agreement on the critical provisions (of section 9) dealing with the relationship of TSCA to other laws.

The TSCA has three objectives.[308] One objective is to prevent unreasonable risks of injury to health or the environment and to take action on imminent hazards from the specified chemicals[309] without unduly impeding technological innovation.[310] It could be argued that the concern over unreasonable risk is negated by the requirement for restraint in regulating such chemicals, thus emasculating the act and rendering it ineffective. Even if this is true, the import of the act in establishing an integrated approach to pollution control is very substantial.

The second objective of TSCA is to have the industry in question test chemical substances—where there is insufficient data to determine their effects—if the administrator finds that (1) they may present an unreasonable risk of injury to health or the environment, (2) they will be produced in substantial quantities and enter the environment in substantial quantities, or (3) they will be produced in substantial quantities and result in significant or substantial human exposure. The purpose of the testing is to determine whether the manufacture, distribution in commerce, processing, use, or disposal of the substance presents an unreasonable risk of injury to health or the environment.[311] The third objective TSCA required was the establishment of an Interagency Testing Committee,[312] to screen chemicals for potential "significant risk of serious and widespread harm" and to recommend a list of chemicals that should be tested further. TSCA defines the term "environment" to include "water, air, land and the interrelationship which exists among and between water, air and land and all living things."[313] Manufacturers are required to give notice to the administrator of EPA before manufacturing a new chemical substance or putting an old substance to a significant new use.[314] TSCA also empowers the administrator to delay or restrict the manufacture of a new chemical,[315] to adopt rules to prohibit manufacture and processing,[316] and to obtain injunctive relief.[317]

TSCA has institutionalized an integrated approach to the control of chemicals. It embraces the entire environment, together with total

307. *Id.*
308. TSCA, § 2(b), 15 U.S.C. § 2601(b) (1982).
309. *Id.* §§ 5(f), 6, 7, 15 U.S.C. §§ 2604(f), 2605, 2606.
310. *Id.* § 6(a), 15 U.S.C. § 2605(a).
311. *Id.* § 4, 15 U.S.C. § 2604.
312. *Id.* § 4(e), 15 U.S.C. § 2603(e). The members of the Committee came from the principal federal agencies having statutory obligations with respect to chemical health risks: the National Institute of Health, the National Cancer Institute, and National Science Foundation.
313. TSCA, § 3(5), 15 U.S.C. § 2602(5) (1982).
314. *Id.* § 5, 15 U.S.C. § 2604.
315. *Id.* § 5(e)(1)(A), 15 U.S.C. § 2604(e)(1)(A).
316. *Id.* § 5(f)(2), 15 U.S.C. § 2604(f)(3)(A).
317. *Id.* § 5(f)(2), 15 U.S.C. § 2604(f)(3)(B).

human exposure, and is not confined to the usual divisions between air, land and water, or to particular routes of exposure. Integration is crystallized by section 9 of TSCA, dealing with the act's relationship to other laws. When available information leads to the conclusion that there is an unreasonable risk of injury to health or the environment from an activity not controlled by other federal laws, section 9 authorizes the administrator to require other agencies to help abate the activity in question.[318]

Even more significant is the provision of section 9[319] dealing with laws administered by EPA. It provides:

> The Administrator shall coordinate actions taken under this chapter with actions taken under other Federal laws. . . . If the Administrator determines that a risk to health or the environment . . . could be eliminated or reduced to a sufficient extent by actions taken under the authorities contained in such other Federal laws, the Administrator shall use such authorities to protect against such risk unless the Administrator determines, in the Administrator's discretion, that it is in the public interest to protect against such risk by actions under this chapter. . . .[320]

The section commands the administrator to coordinate an integrated approach to pollution control established by TSCA with the segmented approaches of the other legislation. The administrator is instructed to consider whether the powers granted under those other acts could be used to control the risks defined in TSCA. If they can, the existing body of pollution control legislation, insofar as it concerned chemicals, would need to be interpreted in the light of the integrating and holistic policies embodied in TSCA. Because the section stipulates that the administrator shall use the powers under those acts rather than TSCA, the case for a reinterpretation of existing legislation is considerably strengthened. In sum, TSCA institutionalizes a countervailing norm of integration. Many of the provisions of apparently single medium statutes can now be interpreted from a different perspective. In the light of TSCA's provisions, it would be very difficult to ignore the applicability of an integrated approach to pollution control in the administration of other legislation.

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318. *Id.* § 9(a)(1), 15 U.S.C. § 2608(a)(1).
319. *Id.* § 9(b), 15 U.S.C. § 2608(b).
320. *Id.*

2. THE CLEAN AIR ACT

In order to execute TSCA's mandate that the Administrator of EPA determine if the "authorities" or powers contained in other laws could be used to further an integrated approach to the control of chemicals, it is necessary to find out if any of those powers could be used in this way. TSCA refers only to chemicals, but chemicals reach into every medium and constitute the greatest threat to the environment today. Chemicals include conventional pollutants[321] as well as hazardous substances that, even at relatively low levels, present risks to human health. When non-integrated protective action against chemicals is taken in one medium, such as air, risks can be transferred to other media.[322] TSCA addresses this problem, and the way in which the integrating principles embodied in TSCA could drive other legislation is illustrated by the Clean Air Act.

In controlling air pollution, the Clean Air Act draws a distinction between conventional or "criteria" pollutants for which national ambient air quality standards are to be set,[323] and the more dangerous "hazardous" pollutants that could cause serious harm even in small quantities. Emission and performance standards are to be set for these "hazardous" pollutants.[324] The provisions of the Clean Air Act applicable to hazardous chemicals have been excruciatingly difficult to administer.[325] This analysis will consider how chemicals may be dealt with under the less onerous provisions dealing with "criteria" pollutants.

Section 4 of TSCA, which triggers the rest of the act, applies to chemical substances in two different situations. The first of these occurs where there is an "unreasonable risk of injury to health and the environment."[326] The other arises when a chemical substance is produced in substantial quantities and may reasonably be anticipated to enter the environment in substantial quantities or cause significant or substantial

321. "Criteria" pollutants under the Clean Air Act such as sulfur dioxide, particulate matter, carbon monoxide, photochemical oxidants, hydrocarbons and nitrogen dioxide are examples of conventional pollutants.

322. COUNCIL FOR ENVIRONMENTAL QUALITY, *supra* note 275, at 12-13.

323. Clean Air Act, §§ 108, 109, 42 U.S.C. §§ 7408, 7409 (1982).

324. *Id.* § 112, 42 U.S.C. § 7412. In contrast to the primary ambient air quality standards for "criteria" pollutants, which are established at levels that provide an "adequate" margin of safety to protect the public health, the emission levels for hazardous pollutants provide for an "ample" margin of safety.

325. Section 112(b)(1)(B) of the Clean Air Act stipulates that emission standards should be prescribed within 180 days of the publication of the list of hazardous pollutants. Clean Air Act, § 112(b)(1)(B), 42 U.S.C. § 7412(b)(1)(B) (1982). EPA has not found it possible to do so. Moreover, it is arguable that an "ample margin" of safety when dealing with hazardous chemicals is tantamount to zero emissions, effectuating a closedown of sources of pollution. EPA has been unwilling to do this. J. TOPPING & A. HELM, CLEAN AIR HANDBOOK 76-90 (1987).

326. TSCA, § 4(a)(1)(A), 15 U.S.C. § 2603(a)(1)(A) (1982).

human exposure to such substances.[327] The rationale for this distinction seems to be that a danger from chemical substances could arise from small quantities of highly dangerous chemicals or large quantities of less dangerous substances. As we have seen, section 9 of TSCA refers to "a risk to health or the environment associated with a chemical substance or mixture." Section 9 seems to stipulate that where the Administrator determines the presence of a risk which does not amount to an "unreasonable" one, and such substance "could be eliminated or reduced to a sufficient extent . . ." by powers under other federal laws, the administrator should as a rule use such laws to control that risk. While the interdiction of unreasonable risk would proceed under the more stringent provisions of TSCA, ordinary risk which could be reduced to a "sufficient" extent under a different statute should be dealt with under that other statute.[328] Accordingly, the hazardous substances causing "unreasonable" risk referred to under section 4 of TSCA would not be subject to control under other laws, while the less dangerous substances giving rise to ordinary risk would be so controlled.

The Clean Air Act controls air pollutants resulting from diverse mobile or stationary sources "that may reasonably be anticipated to endanger public health or welfare."[329] This closely resembles the risk from "substantial human exposure"[330] and the "risk to health or the environment"[331] from chemicals referred to by TSCA, and is the kind of situation governed by section 9 of TSCA. Where it is determined that section 9 applies, the provisions of the Clean Air Act do lend themselves to an integrated approach.

In controlling criteria pollutants, the Clean Air Act retains the concept of an "atmospheric area" introduced by the Air Quality Act of 1967.[332] Within these areas, air quality regions[333] have been established. The relationship of environmental quality to a cross-media approach is quite significant. When dealing with generalized pollution (i.e., pollution which cannot be attributed to just one source of air pollution), air quality objectives can only be achieved after controlling pollution from all sources and pathways. If sewerage works and landfills are sources of pollution, they would need to be assessed in addition to

327. *Id.* § 4(a)(1)(B), 15 U.S.C. § 2603(a)(1)(B)(i).

328. Section 9 provides the administrator with extraordinary power to deal with such a case under TSCA itself, but he would need to justify such a course of action as being in the public interest. *Id.* § 9, 15 U.S.C. § 2608.

329. Clean Air Act, § 108(a)(1)(A) & (B), 42 U.S.C. § 7408(a)(1)(A) & (B) (1982). Welfare is defined as including effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility and climate. *Id.* § 301(h), 42 U.S.C. § 7602(h) (1982).

330. TSCA, § 4(a)(1)(B), 15 U.S.C. § 2603(a)(1)(B)(i)(1982).

331. *Id.* § 9(b), 15 U.S.C. § 2608(b).

332. Clean Air Act, § 107(a), 42 U.S.C. § 7407(a) (1982). There are 10 atmospheric areas.

333. *Id.* § 107(e), 42 U.S.C. § 7407(e). There are 247 such regions.

direct emissions into the atmosphere. Conceptually, environmental quality objectives call for a consideration of all possible sources of air pollution which may affect the objectives in question. Having arrived at the point where all sources and pathways of a pollutant become relevant, it is not difficult to move onto the next step of considering the impact and distribution of pollutants from a given source. The Clean Air Act makes it possible to do just this.

An integrated approach is reinforced by other provisions of the Clean Air Act. Human health is, of course, affected by more than air pollution. A cross-media approach is almost a necessary corollary to any satisfactory regime for the protection of human health. Harm to human health can be caused in three ways: inhalation, ingestion through food or water, and absorption through the skin. While the regulation of air emissions may control ill health caused by inhalation, it is possible that a pollutant could still reach its human target through its presence in water. Polluted water, for example, could be used for drinking, bathing or washing, and fish which had absorbed the pollutant could be eaten, leading to the bio-accumulation of the pollutant in humans.

Numerous provisions of the Clean Air Act dealing with air quality criteria and control techniques are open to integrating interconnections. Section 108(a)(2) requires that air quality criteria shall draw attention to "all identifiable effects on public health or welfare which may be expected from the presence of such pollutant in the ambient air. . . ." The air quality criteria issued by the administrator under TSCA are to include information about variables and other pollutants which, of themselves or in combination with others, may produce adverse effects on public health or welfare.[334] The information the administrator is to provide shall include data about environmental impacts of emission control technology[335] and shall state how processes or procedures for reducing criteria pollutants may increase the emission or formation of other pollutants.[336] The present sparse list of six criteria pollutants could to be expanded on the basis of a cross-media evaluation. The fact that section 108 of the Clean Air Act sets out an uncompromising, even absolutist, demand that human health should be protected at any cost,[337] should not be allowed to avert the wider application of the Clean Air Act. Arguments about the wisdom of such standards or the need to take account of technological and economic considerations

334. *Id.* § 108(a)(2)(A)(C), 42 U.S.C. § 7408(a)(2)(A)-(C) (1982).

335. *Id.* § 108(b)(1), 42 U.S.C. § 7408(b)(1).

336. *Id.* § 108(f)(1)(D), 42 U.S.C § 7408(f)(1)(D).

337. Lead Indus. Ass'n, Inc. v. EPA, 647 F.2d 1130, 1148-56 (D.C. Cir. 1980), *cert. denied*, 449 U.S. 1042 (1980); American Petroleum Inst. v. Costle, 665 F.2d 1176, 1190 (D.C. Cir. 1981), *cert. denied*, 455 U.S. 1034 (1982).

should be addressed to Congress. In any event, the measures contemplated by the Clean Air Act, when dealing with criteria pollutants, are substantially less stringent than those contemplated under TSCA.

The Clean Air Act's state implementation plans (SIPs) provide for the "implementation, maintenance, and enforcement" of both primary and secondary ambient standards.[338] It is, of course, vital that these SIPs should also adopt a cross-media approach, and sections 110(a)(2)(A) and (B) of the act enable this to be done. These sections state that the administrator shall approve such a plan if it provides for the attainment of primary and secondary ambient air quality standards[339] and if "it includes emission limitations, schedules, and timetables for compliance with such limitations, and such other measures as may be necessary to insure attainment and maintenance of such primary or secondary standard. . . ."[340] These provisions dovetail into others dealing with new and existing stationary sources of pollution.[341] In setting standards for them, the administrator is obliged to take into consideration "any nonair quality health and environmental impact and energy requirements."[342]

TSCA drives the implementation of pollution legislation in other ways. We have seen that section 9 compels the administrator of EPA to coordinate actions under TSCA with actions under other laws. This means that, for example, the control of hazardous pollutants under the Clean Air Act and Clean Water Act would need to be coordinated with TSCA. At present, there is little coordination between the setting of emission standards for hazardous air pollutants[343] and discharge standards for hazardous water pollutants[344] and even less coordination between the three statutes.

The opportunities for integration are made more promising by another development. As noted in Part II, EPA resisted the application of NEPA to its own regulatory activities, and EPA was exempted from complying with the more exacting conditions of NEPA because the Clean Air Act demanded the "functional equivalent" of a NEPA impact assessment. In holding that EPA should undertake the functional equivalent of a NEPA impact assessment when setting standards for new sources under section 111 of the Clean Air Act, the court of appeals in *Portland Cement* opened the door to similar interpretations not only of other provisions of the Clean Air Act, but also of all other acts ad-

338. Clean Air Act, § 110(a)(1), 42 U.S.C. § 7410(a)(1) (1982).
339. *Id.* § 110(a)(2)(A), 42 U.S.C. § 7410(a)(2)(A) (1982).
340. *Id.* § 110(a)(2)(B), 42 U.S.C. § 7410(a)(2)(B) (1982).
341. *Id.* § 110, 42 U.S.C. § 7411 (1982).
342. *Id.* § 110, 42 U.S.C. § 7411(a)(1) (1982).
343. *Id.* § 112, 42 U.S.C. § 7412 (1982).
344. Clean Water Act, § 307, 33 U.S.C. § 1317 (1982).

ministered by EPA. The decision certainly was a factor behind EPA's decision to take what has been described as the "giant practical step"[345] of issuing a policy statement declaring that it would voluntarily prepare environmental impact statements in connection with certain major regulatory activities.[346] There apparently were other reasons that led to this decision. The question whether EPA should be bound by NEPA had already been examined by an internal EPA task force[347] that had recognized that at least one part of the rationale for EPA's creation was to promote a coordinated, multi-faceted approach to the solution of environmental problems.[348] This internal recognition of the need to undertake wide environmental assessment made it difficult for EPA to insist that it lacked integrative functions. Further, EPA had been urged by the House to prepare impact assessments,[349] and, $5 million was appropriated to EPA for the preparation of environmental impact statements.[350] Up until now, the majority of EPA's voluntary preparation of impact statements has been restricted to treatment plant construction grants and Clean Water Act section 208 area-wide planning grants,[351] but there is no reason why it should be so restricted. The preparation of impact analysis prior to its regulatory activities dealing with chemicals would indeed constitute a major step towards the integration envisioned by TSCA.

C. Possible Constraints

A further concomitant of an integrated approach is the reliance placed on the expertise of administrators. Decisions as to how integration should be achieved in the particular circumstances of a case cannot be dictated in advance. To the extent that integration does not lend itself to specific legislative prescription, it calls for a renewal and reaffirmation of belief in New Deal expertise. This does present the danger of a possible recurrence of those problems which led to the eschewing of

345. Comment, *Coordinating the EPA, NEPA, and the Clean Air Act*, 52 TEX. L. REV. 527, 529 (1974).

346. 39 Fed. Reg. 16,186-87 (1974).

347. TASK FORCE REPORT, *supra* note 63.

348. The task force noted, however, that some statutory mandates may prevent EPA from undertaking the wider investigation demanded by NEPA. *Id.* at 46. It also drew attention to major unanswerable questions about the scope of impact statements under NEPA to which EPA might be subject. The questions included the extent to which EPA should consider effects not commanded by or inconsistent with specific statutory mandates; whether a broad scale cost-benefit analysis is permissible or required; whether a final statement should be issued prior to proposing regulations. *Id.* at 48.

349. H.R. REP. NO. 520, 93d Cong., 1st Sess. 18-19 (1973).

350. Agriculture — Environmental and Consumer Appropriation Act, 1974, Pub. L. No. 93-135, 87 Stat. 468, 482 (1973).

351. J. BATTLE, ENVIRONMENTAL DECISIONMAKING AND NEPA 113 (1986).

expertise.[352] It will be argued that there is little possibility of "capture" where there are vigilant "watchdog" groups. Environmental groups manifest their presence, and their impact is felt in no uncertain terms, thereby making agency surrender to industry quite unlikely. Moreover, reasonable safeguards against administrative malaise can be provided. Finally, the risks of maladministration are justified by the benefits of an integrated system as against a fragmented one. Furthermore, it might be argued that the countervailing goal presented by TSCA will only confuse EPA, as the agency will be torn between the competing pressures of differing goals. Competing pressures, however, are among the normal problems facing administrators. The traditional model of administrative law which conceives of the agency as a mere transmission belt for implementing specific and defined legislative directives often mocks reality. Instead, statutes create broad and indefinite goals, while granting agencies wide discretion to implement those inchoate goals. In carrying out their legislative mandate, the agencies are constrained to act as surrogate legislatures and adopt procedures designed to reconcile the competing goals of legislation and adjust the claims of those affected by those goals.[353] This view of the administrative process was developed by political scientists and is now widely shared by judges, legislators, practitioners and legal commentators.[354] In some cases, the goals mentioned in the law merely comprised a "laundry list" that leaves gaping uncertainties concerning the mission of the program.[355] In others, the multiplicity of goals may render more than one of them incapable of fulfillment.[356]

EPA should choose to implement the clear integrating norms embodied in existing legislation such as TSCA and NEPA.[357] In order to do so, EPA would need to establish rules that detail the manner in

352. *See supra* text accompanying notes 75-89. The views advanced in this Article draw support from J. WILSON (*see supra* notes 74 and 104) and Sabatier, *Social Movements and Regulatory Agencies: Toward a More Adequate—and Less Pessimistic—Theory of "Clientele Capture,"* 6 POL'Y SCI. 301 (1975).

353. Stewart, *supra* note 179, at 1671-88; A. BONFIELD, *supra* note 212, at 8-10.

354. Stewart, *supra* note 179, at 1683 n.64.

355. F. THOMPSON, HEALTH POLICY AND THE BUREAUCRACY: POLITICS AND IMPLEMENTATION 47-48 (1981).

356. R. PIERCE, S. SHAPIRO & P. VERKUIL, ADMINISTRATIVE LAW AND PROCESS 44-45 (1985) (describing the telling example of the Emergency Petroleum Allocation Act, which required the president to promulgate a regulation for the mandatory allocation of petroleum products which was to protect the public health, maintain public services and agricultural operations, preserve a sound and competitive petroleum industry, allocate crude oil to refiners to permit them to operate at full capacity, result in an equitable distribution of supplies to all parts of the country, promote economic efficiency, and minimize economic distortion). The regulation was codified at 15 U.S.C. § 753(b)(1) (1982).

357. *See supra* note 219 and accompanying text. Integrating norms are being treated as public-regarding norms. *See* Macey, *Promoting Public-Regarding Legislation Through Statutory Interpretation: An Interest Group Model*, 86 COLUM. L. REV. 223, 250-51 (1986).

which the agency would resolve the pulls of differing goals and competing claims in its move towards integration. This is clearly a "political" process,[358] and there is a danger that EPA in responding to interest group politics, as well as to the currents of thinking leading to the adoption of a fragmented approach,[359] will be steered away from integration. Both practical and theoretical considerations suggest otherwise.

At a practical level, environmental interest groups are not generally motivated by incremental thinking to the degree evident in the late 1960s and early 1970s. This is borne out by EPA's striking move towards integration in the early 1980s, when it adopted the consolidated permit regulations, which it was hoped would synthesize the separate single-medium permit systems to provide a more comprehensive environmental evaluation of industrial projects.[360] The regulations were an initiative of the Carter Administration aimed at governing the hazardous waste management program under the Resource Conservation and Recovery Act,[361] the Underground Injection Control program of the Safe Drinking Water Act,[362] the National Pollutant Discharge Elimination System, and State Dredge or Fill programs under the Clean Water Act,[363] and the Prevention of Significant Deterioration program under the Clean Air Act.[364] The consolidated regulations were clearly integrating[365] in intent. Several environmentalist and industry petitioners challenged these regulations in court,[366] but the environmentalist groups did not challenge the need for a comprehensive approach. The main challenge to the regulations came from industry groups that claimed that the regulations imposed additional burdens.[367]

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358. A. BONFIELD, *supra* note 212, at 8-9.

359. *See supra* text accompanying notes 51-147.

360. 45 Fed. Reg. 33,290 (1980). C. Sellers, in The Rise and Fall of the Consolidated Permit Program—A Case Study of a Reform Effort Within the EPA 9-11 (unpublished paper submitted to Conservation Foundation Aug. 14, 1984), argues that the Consolidated Permit Program foundered because the original environmental objective of integrating all phases of air, water and solid waste cycles was lost in the effort to justify the program on efficiency and paper reduction grounds.

361. Renamed as the Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6991i (1982 & Supp. IV 1986).

362. Renamed as the Public Health Service Act, 42 U.S.C. §§ 300(f)-300(j)(11) (1982 & Supp. IV 1986).

363. 33 U.S.C. §§ 1251-1376 (1982).

364. 42 U.S.C. §§ 7401-7642 (1982 & Supp. IV 1986).

365. The most important environmental benefit was listed as the "more comprehensive management and control of wastes." 45 Fed. Reg. 33,291 (1980).

366. Natural Resources Defense Council, Inc. v. EPA, 673 F.2d 392 (D.C. Cir. 1980). *See* C. Sellers, *supra* note 360.

367. Under the Reagan Administration, the regulations were "de-consolidated" (effectively repealed) in response to the President's Task Force on Regulatory Relief. 13 Envtl. Rep. 2205 (BNA) (1983).

Even if interest groups behave differently and exert pressure on EPA to desist from integrating policies, it is submitted that EPA is entitled to resist such pressures. It is the EPA's duty to interpret and execute the goals embodied in legislation, in what it considers to be the best public interest. A "republican" theory of government[368] and a "public interest" or Weberian model of administration[369] offer strong theoretical justification for the view that Congress mandates and empowers the agency to determine what constitutes the public interest and public good. It is the responsibility of the legislature to reconcile competing groups and render clashing interests subservient to the public good.[370] Where this has been done and legislative goals are clear, the policymaker must promote only those goals specified by the politically responsible legislature.[371] Where they are not clear, or there are competing goals, the agency takes on the mantle of a surrogate legislature. The agency's task, however, is not to mediate in a struggle between self-interested groups who impress their preferences on the agency, but rather to determine the public interest and the public good. It is envisioned that the private interests of the citizens and interest groups will be subordinated to the public good,[372] as determined by the agency.

A "republican" view of government and a "public interest" model of administration are supported by evidence of a general movement from incrementalism to comprehensive rationality. It is a movement that represents an historical and logical progression of ideas and institutions. We have taken note of Lindblom's criticism of the rational model of decision making.[373] Lindblom's alternative of an incremental approach is open to criticism on a number of grounds. It is premised on the view that the results of present policies must, on the whole, be satisfactory.[374] If the present policies are manifestly inadequate or wrong, it would be folly to persist in variations of them. Furthermore, incrementalist strategy almost by definition does not apply to fundamental

368. D. EPSTEIN, THE POLITICAL THEORY OF THE FEDERALIST 93-99 (1984); Bessette, *Deliberative Democracy: The Majority Principle in Republican Government*, in HOW DEMOCRATIC IS THE CONSTITUTION? 102 (R. Goldwin & W. Schabbra eds. 1980). Sunstein, *supra* note 219; Reich, *supra* note 219.

369. Michelman, *Political Markets and Community Self-Determination: Competing Judicial Models of Local Government Legitimacy*, 53 IND. L.J. 145, 149 (1977-1978); Mashaw, *Mirrored Ambivalence: A Sometimes Curmudgeonly Comment on the Relationship Between Organization Theory and Administrative Law*, 33 J. OF LEGAL EDUC. 24, 29 (1983).

370. THE FEDERALIST NO. 10, at 57 (J. Madison) (S. Mittell ed. 1938).

371. Diver, *supra* note 215, at 398-99.

372. Sunstein, *supra* note 219, at 31. This view also draws support from Macey, who maintains that courts should construe statutes according to their public-regarding goals and principles. Macey, *supra* note 357, at 250-56. On a parity of reasoning, agencies should act likewise.

373. *See supra* notes 91-94 and accompanying text.

374. Dror, *Governmental Decision Making: Muddling Through—"Science" or Inertia?*, 24 PUB. ADMIN. REV. 153, 154 (1964).

decisions,[375] and fundamental decisions set the context and lay the foundations for incremental decisions.[376] Incremental decisions may lead to and follow upon fundamental decisions but cannot be understood without them. Decisionmaking, therefore, is a dynamic consisting of some fundamental decisions and a number of incremental decisions which modify, build upon and/or alter those fundamental decisions. To arrive at such fundamental decisions, however, it is necessary to step outside the incremental model in order to gain a wider conceptual horizon. The move towards an integrated strategy is being advocated as a fundamental decision which can substantially alter the whole course of environmental policy. It has been argued cogently that incremental processes which serve at an early stage of a policy initiative should, in a number of cases, evolve into a more rational analysis. "[T]his transformation can best be understood as a movement from an 'incrementalist' model of policymaking to one of 'comprehensive rationality.' "[377] The thrust of such a conclusion has been endorsed by prominent administrative lawyers, both specifically and generally,[378] and by political scientists.[379]

It is possible to use an evolutionary model of jurisprudence[380] and to view comprehensive rationality as evolving from incrementalism. Evolutionary theories in jurisprudence are more than merely theories that the law changes. They are theories contained in a much larger paradigm that describes how the world changes and ought to respond in the face of resource scarcity and natural selection. It is tradition with a rich jurisprudential lineage that extends from historical jurists like Savigny[381] and Maine,[382] to others like Wigmore and Kocourek,[383] to

375. D. BRAYBROOKE & C. LINDBLOM, *supra* note 90, at 66-69.

376. Etzioni, *Mixed-Scanning: A "Third" Approach to Decision-Making*, 27 PUB. ADMIN. REV. 385, 387 (1967).

377. Diver, *supra* note 215, at 394-95.

378. Specifically with regard to pollution control, see Rehbinder & Stewart, *supra* note 271, at 1-13; more generally see A. BONFIELD, *supra* note 212, at 3-11.

379. *E.g.*, RABE, *supra* note 1, at 156-60.

380. See Hovenkamp, *Evolutionary Models in Jurisprudence*, 64 TEX. L. REV. 645 (1985), and Elliott, *The Evolutionary Tradition in Jurisprudence*, 85 COLUM. L. REV. 38 (1985), for illuminating reviews of the literature dealing with the American tradition of legal evolution. See also P. STEIN, LEGAL EVOLUTION: THE STORY OF AN IDEA (1980), which deals with theories of legal evolution in eighteenth- and nineteenth-century European jurisprudence, and describes the ideas of jurists such as Bentham, Savigny and Maine. Stein, however, concludes that theories of evolution were nineteenth-century phenomena and did not survive the end of the century. *Id.* at 122.

381. F.VON SAVIGNY, ON THE VOCATION OF OUR AGE FOR LEGISLATION AND JURISPRUDENCE (A. Hayward trans. London 1831 and Arno Press reprint 1975). Savigny suggests that law is not the intentional creation of governors, but evolves out of the common spirit of the people.

382. H. MAINE, ANCIENT LAW: ITS CONNECTION WITH THE EARLY HISTORY OF SOCIETY AND ITS RELATION TO MODERN IDEAS (Beacon Ed. 1963). Maine identifies three successive stages in the evolution of progressive societies.

383. EVOLUTION OF LAW: SELECT READINGS ON THE ORIGIN AND DEVELOPMENT OF LEGAL INSTITUTIONS (J. Wigmore & A. Kocourek eds. 1915-1918) (three volumes). In the third volume,

pragmatic instrumentalists like Holmes[384] and Pound,[385] and includes Clark[386] and Rodgers.[387] It is not proposed, however, to explain the theoretical underpinnings for a move from incrementalism to integration in terms of Darwinian or other socio-biological theories of evolution.[388] What is being offered is a more practical explanation of incrementalism as a passing stage in the development or evolution of environmental policies. The winds of change are blowing the present fragmented policies stranded in incrementalism towards those of integration based on comprehensive rationality. Rather than view the implementation of cross-media policies as another difficulty, EPA should see their task as an opportunity for shaping and reforming public values, and for contributing to the community's understanding of this problem.[389]

V. CONCLUSION

We have seen how ecological streams of thinking based on integration arose at a time of general disillusionment with New Deal idealism. A suspicion of administrative expertise shaped the environmental perspective and resulted in calls for clear, precise and easily followed legislative mandates. Such demands converged with incrementalist models of administration and resulted in the institutionalization of fragmenta-

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titled FORMATIVE INFLUENCES OF LEGAL DEVELOPMENT, the authors develop a comprehensive theory of legal evolution.

384. O. HOLMES, THE COMMON LAW (1946). In a celebrated passage, Holmes began:

> The life of the law has not been logic: it has been experience. The felt necessities of the time, the prevalent moral and political theories, intuitions of public policy, avowed or unconscious, even the prejudices which judges share with their fellow-men, have had a good deal more to do than the syllogism in determining the rules by which men should be governed.

Id. at 1. As Elliot remarks, Holmes' claim that legal doctrines evolve in response to changes in the social environment has become virtually a canon of faith for American lawyers. Elliot, *supra* note 380, at 51.

385. R. POUND, LAW AND MORALS (1924); R. POUND, SOCIAL CONTROL THROUGH LAW (1942). Pound believed that jurisprudence developed historically through three evolutionary stages. *See* LAW AND MORALS, at 29-33.

386. Clark, *The Morphogenesis of Subchapter C: An Essay in Statutory Evolution and Reform*, 87 YALE L.J. 90 (1977); Clark, *The Interdisciplinary Study of Legal Evolution*, 90 YALE L.J. 1238 (1981).

387. Rodgers, *Bringing People Back: Towards a Comprehensive Theory of Taking in Natural Resources Law*, 10 ECOLOGY L.Q. 205 (1982).

388. Elliot, for example, considers theories about the nature and sources of law to be evolutionary if they propose that the law is shaped by its environment in a way that is analogized explicitly to Darwin's theory of evolution in biology. Elliot, *supra* note 380, at 39. Darwin suggested that the forms of living things are shaped by environmental conditions and not the design choices of a creator. But as Hovenkamp points out, jurisprudence was evolutionary long before Darwin and will continue to be evolutionary. Hovenkamp, *supra* note 380, at 645.

389. Administrator Ruckelshaus of the EPA faced up to similar ehallenges. Reich, *supra* note 219, at 1632-40.

tion. The new confluence of fragmented thought swamped even integrating developments, such as NEPA and EPA, and obstructed the implementation of others, such as TSCA. After some remarkable successes, fragmented policies have resulted in equally conspicuous failures, and these failures call for a review and re-examination of existing policies, and demand fresh initiatives. A re-examination of the foundations of environmental thought, law and policy reveals the extent to which the answers to contemporary problems can be shaped by a rediscovery of existing integrative norms. Existing integrative norms are rendered even more important in the light of a different convergence of thoughtways. Incrementalism is giving way to comprehensive rationality, and comprehensive rationality admirably complements the pursuit of integration. This Article has suggested how the ecological thinking which gave birth to NEPA, EPA and TSCA could be meshed with comprehensive rationality in order to meet the challenge of the 1990s and the twenty-first century.

The most promising way out of the present impasse is for EPA to restructure itself along functional lines, abolish its programmatic divisions, and take a fresh look at the statutes it administers. It may be a difficult undertaking, but it is not anything as exacting as trying to persuade Congress to disengage itself from the existing legislation. Significantly, Administrator Reilly,[390] together with many others within EPA,[391] have acknowledged the critical importance of an integrated approach and the need to change direction. By moving from an incremental, program-based approach to one that is functional and rational, EPA will be reclaiming its integrating mandate, while simultaneously rediscovering its ecological roots. Perhaps there may be a happy ending to the story.

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In the face of losses and setbacks, the Great Agency decided to review its earlier position and reconsider the philosophy underlying its creation. This led to the re-opening of the minds of many important officers of the Great Agency who soon realized the folly of their ways. They decided to reform the Agency by breaking down the programmatic barriers which had been the principal cause of many of its failures, and by implementing forgotten mandates. It was no easy task. The walls separating air, water and land pollution, unlike those of Jericho, did not crum-

390. *See supra* notes 277-80 and accompanying text.

391. Alm, *The EPA's Approach to Cross-Media Problems*, in NEW PERSPECTIVES, *supra* note 1; Schmandt, *Managing Comprehensive Rule Making: EPA's Plan for Integrated Environmental Management*, 45 PUB. ADMIN. REV. 309 (1985).

ble before a trumpet blast, and those within the walls resisted stubbornly. But the reformers persisted and finally prevailed. Following upon the removal of the walls and the abolition of single-medium programs, a new strategy of cross-media pollution control replaced single-medium campaigns. Since then, there have been dramatic changes in the war against the Hydra. Its true identity and nature are better understood, and its many heads are recognized as different manifestations of the same creature. The Great Agency is able to integrate and coordinate its attacks against the Hydra, and many battles have been won. The war still goes on, but the character and weaknesses of the Hydra are understood, and a better organized and equipped Great Agency is confident of the final outcome.