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Law and Policy in the Activist State: Rethinking Nuclear Regulation

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I. INTRODUCTION

This Article concerns the interaction of law and policy and its impact on the formation of rules of law and their implementation. In a modern bureaucratic polity, law and policy interact according to a set formula: law follows policy in the activist state. This Article will analyze the law-follows-policy formula in the context of nuclear power regulation.

Nuclear policy has not kept up with the political or economic climates which have grown skeptical of nuclear power. This failure or inability of the nuclear power bureaucracy to respond effectively to political and economic changes is the essential weakness in the law-follows-policy formula. When dramatic changes in politics or markets occur, policy that has been institutionalized by law becomes fragmented, and unfairness, inefficiency, and regulatory failure result. Specifically, in the regulation of nuclear power, consumers, investors, and taxpayers have had to bear the costs of industrial abandonment of nuclear projects. This result is both unfair and inefficient because these groups enjoy little participation in nuclear regulation policymaking. Thus, a cost-allocation theory maximizing efficiency and fairness must align more closely financial liability with policymaking responsibility.

A pristine legal culture where law is autonomous and legal rules are completely or nearly devoid of policy can be conceived[1] but such a

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1. *Compare* H.L.A. HART, THE CONCEPT OF LAW 18-25 (1961) (the strongest modern statement

positivist state is not ours. Law reflects the economic, political, and moral values which are the shaping forces of policy. Indeed, law and policy interact in several configurations.[2] Legal cultures and subsystems within a single culture differ primarily in the degree that public policy influences law.[3] Modern government, with its emphasis on economic planning and

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of legal positivism as a neutral rules system) *with* R. DWORKIN, TAKING RIGHTS SERIOUSLY 14-80 (1977) (asserting that law is more than a system of rules; it also consists of policies, principles, and standards informed by politics).

2. At least four models describe the interaction of law and policy. The author has consciously chosen the simplest of the four; the law-follows-policy formula is the dominant mode of interaction. The focus is on the legislation Congress enacts, the regulations agencies promulgate, or on what a reviewing court decides.

Model I, in which law follows policy, is based on two legal realist premises. The first is that law is not value neutral. The second is that the legal system assists government in the implementation of its policies. *See, e.g.*, B. ACKERMAN, RECONSTRUCTING AMERICAN LAW 6-22 (1984); G. WHITE, PATTERNS OF AMERICAN LEGAL THOUGHT 99-135 (1978).

In increasing order of complexity, Model II posits that policy follows law. This positivist model is more complex because it requires a settled definition of law and a partial suspension of belief. Model II requires a conception of law as an objective and neutral manifestation of a just order that exists as given and is then applied to a determinate policy dispute or problem. Thus, policy is formulated to fit the given law. Model II functions at an operational level. For example, a Nuclear Regulatory Commission staffer may accept the agency's promotional nuclear policy and wish to limit consumer intervention in a licensing hearing. The staffer, however, is constrained by the law of due process and must allow meaningful participation. Therefore, policy must follow law. Note that a study of the law's impact on an agency, from an organizational perspective, is distinct from the more systematic examination of the interaction of law and policy which is the subject of this Article. *See* J.M. Montgomery, Law as an Organizational Variable: An Examination of the Impact of Law on the Performance of the U.S. Nuclear Regulatory Commission (April 23, 1984) (unpublished doctoral dissertation, School of Government and Business Administration, George Washington University).

The third configuration combines the first two models. In Model III law and policy interact in different sequences at different times. Sometimes law affects policy; sometimes policy shapes law. This model adds more detail and raises new questions: Are there identifiable sets of circumstances or categories in which one formula governs the other? Is there an arrangement or relationship between categories? Model III better describes the operational interaction of "law" and "policy" as general topics. Further, in this model, the interaction of law and policy is the sum of the manifestations of law and of policy. The word "manifestation" should be explained. Law and policy are not concrete. Rather, they are artificial devices that are used to understand and make sense of the complexities of everyday objective and subjective, individual and collective, life. Thus, the "interaction of law and policy" is a manifestation of the operations of the modern regulatory state.

Model IV can be called the Cybernetic Model. In this model, law and policy inform, influence, and illuminate each other as information continuously flows through two interconnected systems. The systems are neither discrete nor ordered as suggested in Model III. In the Cybernetic Model, the interaction of law and policy describes an entirely different manifestation than does Model III: it is something other than the sum of the manifestations of law and policy. *See, e.g.*, J. STEINBRUNER, THE CYBERNETIC THEORY OF DECISIONS (1974).

Model IV is the most attractive but is also the most problematical. The model is attractive because it does not order the relationship between law and policy and thus, is less deterministic than the others. It is also less reductionist because it does not demand firm definitions of either law or policy. Thus, the interactions of law and policy in Model IV are more flexible, fluid, and open to possibilities. This last characteristic is the undoing of the model. The possibilities are endless: Law and policy may be arranged hierarchically, cyclically, circularly, statically, dynamically, continuously, or discontinuously, or some combination thereof. This wide range of possibilities presents the most pressing problem of Model IV: no adequate vocabulary exists to describe the phenomena that occur within the model.

3. *See* C. LINDBLOM, POLITICS AND MARKETS (1977) (a thorough analysis of various social configurations which differ to the extent governments replace markets).

social steering, depends on law to implement policy.[4] Such dependency, however, is problematic when the policy choice turns out to be mistaken or carries with it unforeseen consequences. One example of mistaken policy is the promotion of private commercialization of nuclear power by a joint government-industry enterprise. The story that unfolds demonstrates that when there is a drastic change in external politics and markets, policy is splintered and unfairness and inefficiency result[5] because the now-mistaken policy has become embedded or institutionalized in society by law.

This Article contains certain narrowing assumptions. First, because defining "law" is the consuming task of jurisprudence,[6] and defining "policy" is that of political science,[7] working definitions of both are used. Second, the discussion of the interaction of law and policy concentrates on nuclear power and its regulation. Thus, the analysis is contextually-based and therefore bounded. Finally, the discussion of nuclear regulation also takes place within a distinct legal culture referred to as the activist state, described below.[8] These are the primary descriptive assumptions underlying the analysis of contemporary nuclear power regulation.

There is also an important underlying normative assumption. This Article adopts a pragmatic but questioning acceptance of the liberal theory of law and government, and therefore of the necessity of government regulation. Sophisticated arguments can be made to support the claim that bureaucratic regulation either limits human action or is woefully inefficient and is therefore unnecessary or wrong.[9] These arguments, however, are too utopian or nihilistic to be taken seriously. Further, the deconstructionist argument against bureaucracy fails to recognize that, because government and industry are pervasively involved

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4. *See, e.g.*, Reich, *The Law of the Planned Society*, 75 YALE L.J. 1227 (1966).

5. *See generally* S. BREYER, REGULATION AND ITS REFORM 15-188 (1982).

6. *See, e.g.*, HART, *supra* note 1, at 1, which notes:

> Few questions concerning human society have been asked with such persistence and answered by serious thinkers in so many diverse, strange, and even paradoxical ways as the question "What is law?" Even if we confine our attention to the legal theory of the last 150 years and neglect classical and medieval speculation about the "nature" of law, we shall find a situation not paralleled in any other subject systematically studied as a separate academic discipline.

See also P. SOPER, A THEORY OF LAW 1-15 (1984).

7. *See, e.g.*, T. DYE, POLICY ANALYSIS *passim* (1976).

8. *See infra* text accompanying notes 14-17. *See also* B. ACKERMAN, *supra* note 2, at 1-5; B. ACKERMAN & W. HASSLER, CLEAN COAL/DIRTY AIR 1-12 (1981). Ackerman describes the activist state as a society which "depends upon a continuing flow of self-conscious decisions made by politically accountable state officials." B. ACKERMAN, *supra* note 2, at 1. Although Ackerman's description of the activist state and much of his political analysis which surrounds it is accurate, his view of the liberal theory of law is debatable. Specifically, the author rejects Ackerman's dependence on neutrality as the attribute of the state. *See* Tomain, *Constructing A Way Out of the Liberal Predicament*, 1985 A.B. FOUND. RESEARCH J. 345, 346, 355 (1986).

9. Frug, *The Ideology of Bureaucracy in American Law*, 97 HARV. L. REV. 1276, 1279-86 (1984) (asserting that bureaucracy limits human action); Kaplow, *An Economic Analysis of Legal Transitions*, 99 HARV. L. REV. 509 (1986) (exploring the inefficiency of bureaucratic transitions).

with each other, the likelihood or desirability of a nightwatchman state is simply unrealistic.[10] More importantly, the argument too heavily discounts, and therefore subverts, the place of law in modern society. Law can contribute to a better and more just world even when wrongly influenced by policy, as is the case with nuclear regulation. The legal system is sufficiently resilient to avoid staying mired forever in bad policy choices. Notwithstanding this affirmation of faith, regulatory breakdown occurs when governmental policy demands overload the law, resulting in inefficiency and unfairness.

Working definitions of the law-follows-policy formula must be provided. In defining law, the terms law and legal system are used interchangeably. The legal system is comprised of decisionmaking structures, such as the Nuclear Regulatory Commission, and decisionmaking methodologies such as licensing. When the structure applies a methodology, either to decide a past dispute or issue a prospective promulgation, a rule results. Thus, *law* encompasses structures, methods, and rules.[11] *Policy* is more amorphously defined as the articulated political preferences and actions of government.[12] Further, policy is developed by two major forces, politics and markets.[13]

The *activist state* is the historic continuation of and ideological successor to the New Deal. This conception of the state is grounded in the neo-liberal ideal that, in a complex world, central government must take an active role in mediating conflicts between the one and the many. Market imperfections mandate government involvement in the distribution and allocation of wealth and power based on principles of equality and fairness.[14] One refinement remains. Law and policy have a peculiar

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10. For an elaboration of the nightwatchman minimalist state, see R. NOZICK, ANARCHY, STATE AND UTOPIA 25-28 (1974) (describing a state limited to the functions of protecting all citizens but compelling only part of society to pay for the protection).

11. The "jurisprudence of rules" is a rich field of law which ranges from Hart's positivism, *supra* note 1, to Dworkin's legal liberalism, *supra* note 1, to the more politicized Marxian version, *e.g.*, D. KAIRYS, THE POLITICS OF LAW 5-6 (1982). For various dimensions and characteristics of the jurisprudence of rules, see Kennedy, *Form and Substance in Private Law Adjudication*, 89 HARV. L. REV. 1685, 1687-1713 (1976).

12. *See* T. DYE, *supra* note 7, at 1; A. WILDAVSKY, SPEAKING TRUTH TO POWER: THE ART AND CRAFT OF POLICY ANALYSIS 15-19, 387 (1979); DeLong, *Informal Rulemaking and the Integration of Law and Policy*, 65 VA. L. REV. 257, 329-54 (1979); Diver, *Policymaking Paradigms in Administrative Law*, 95 HARV. L. REV. 393, 396-401 (1981).

There are as many conceptual levels of policy analysis as there are definitions. Policy can be analyzed at an operational, departmental, agency, or branch of government level. One can also pose the question: What is the policy of law? Clearly, the crucial step is articulating the issue. The policy questions involved are: How do nuclear power law and policy interact? And, what are the broader implications for modern bureaucracy?

13. *See generally* C. LINDBLOM, *supra* note 3, at 17-62.

14. Precisely how principles of equality and fairness apply to modern society comes within the purview of political theorists. *See generally* B. ACKERMAN, SOCIAL JUSTICE IN THE LIBERAL STATE (1980); R. NOZICK, *supra* note 10; J. RAWLS, A THEORY OF JUSTICE (1971). More narrowly, the idea of governmental regulation is based on the concept of correcting market failures. *See, e.g.*, Breyer, *Analyzing Regulatory Failure: Mismatches, Less Restrictive Alternatives, and Reform*, 92 HARV.

interaction in the context of the activist state. In a modern capitalist, or especially in a postmodern, late capitalist state, the legal system facilitates the policy choices of government.[15] The premise of the law-follows-policy formula is that in the activist state the legal system fairly and efficiently implements political preferences. The consequence is that those preferences become institutionalized in the legal system and society. The risk is that once a policy sours, because, for example, political or market climates change, regulatory failure results.[16] Therefore, law and policy in an activist state interact so that policy choices are replicated in the recesses of the legal system and reverberate through society. Nuclear regulation is currently working through the confusion of having an outworn policy trapped in a legal system of its own making. As policy choices change, the legal system responds slowly, inefficiently, and unfairly.[17] More simply, policy mistakes become embedded in society through law and thus are hard to change.

Society is experiencing a transformation in nuclear policy which raises serious questions about the future of nuclear regulation and the contours of government-industry relations in complex technological areas. Part II narrates the causes of the transition and explains the implications. In Part II, nuclear energy and regulation will be placed into historic and economic contexts. The thesis is that the multi-billion dollar investment in nuclear power has been a costly mistake as evidenced by industrial abandonment of nuclear projects. Now nuclear regulation is undergoing its second major transition in attempting to allocate the abandonment costs; this transitional phase contains the seeds necessary for reform. Indeed, more responsible nuclear policy can develop by examining the causes of the breakdown of the former policy and anticipating the consequences flowing from the existing set of legal rules and institutions established to further a promotional nuclear policy. Part III describes and evaluates the interaction of nuclear law and policy. The danger of the overdependence of law on policy must be recognized. Law and policy interaction forces law to reproduce policy long after the policy choice changes. Correcting misguided policy means correcting the legal system through a bureaucratic fix. Part III describes the current model of legal liability rules and suggests a direction for regulatory reform.

Part IV describes what the policy and regulatory futures look like and should look like. That future is being formed now. Briefly, the conclusion is that commercial nuclear power and its regulation move largely by their own momentum. Government and industry invested heavily in nuclear

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L. REV. 547, 552-60 (1979).

15. This function is also referred to as "public law." *See* R. PIERCE, S. SHAPIRO & P. VERKUIL, ADMINISTRATIVE LAW AND PROCESS 1-42 (1985) [hereinafter cited as R. PIERCE].

16. *See* Breyer, *supra* note 14, at 560-78; *see also* R. LITAN & W. NORDHAUS, REFORMING FEDERAL REGULATION 59-99 (1983).

17. *See, e.g.*, S. BREYER, *supra* note 5, at 191-314.

power because it promised so much. Their belief was that a healthy energy future would be assured by choosing the nuclear option. Thus in the rush to meet the future, both government and industry created a regulatory structure promoting nuclear power without either party assuming concomitant responsibility. Safety, environmental, and financial risks were passed from government and industry to consumers, investors, and taxpayers. Such was the faith in nuclear power. That faith has led to disillusionment; disillusionment has led to a reconsideration of the current place of nuclear power in our energy plan and, more generally, the relationship of government and industry in a world of high technology. Additionally, an alternative future is outlined which suggests a richer and more deeply responsive regulatory regime.

II. REGULATION IN TRANSITION

A. *A Brief Nuclear History*

To understand the nature of the interaction of law and policy, one must understand the relationship between the institutions and actors who influence the development and formation of both. The federal government has been pivotal in the development, regulation, and promotion of nuclear technology since its inception. In fact, the government-industry relationship in commercial nuclear power is a paradigm of how business is conducted in the activist state. Essentially, the history of that relationship is a history of mutual encouragement and protection. Subatomic physics has been on the cutting edge of the hard sciences since the turn of the century. However, the translation from a theoretical and experimental science to an applied technology did not occur until the United States government galvanized a preeminent group of physicists to design and construct the atomic bomb to counter the perceived but mistaken threat of Nazi Germany's first building and using such a bomb.[18] Nuclear power's first public appearance resulted in the devastation of two Japanese cities, the end of World War II, and the dawn of the nuclear age. The end of the war ended the military's near-exclusive control of nuclear technology, and began nuclear power's first transition.

The shift from military to commercial use was done at the behest of physicists intrigued by the scientific and technological mysteries of

18. For brief histories of the regulation of the nuclear industry, see generally A. AMAN, ENERGY AND NATURAL RESOURCES LAW: THE REGULATORY DIALOGUE § 7.01-.03 (1983); J. CHUBB, INTEREST GROUPS AND THE BUREAUCRACY: THE POLITICS OF ENERGY 89-125 (1983); D. DAVIS, ENERGY POLITICS 143-72 (1974); N. POLSBY, POLITICAL INNOVATION IN AMERICA 18-35, 55-74 (1984); Quirk & Terasawa, *Nuclear Regulation: An Historical Perspective* 21 NAT. RESOURCE J. 833 (1981). Lengthier treatments can be found in I.C. BUPP & J. DERIAN, LIGHT WATER: HOW THE NUCLEAR DREAM DISSOLVED (1978); G. MAZUZAN & J. WALKER, CONTROLLING THE ATOM: THE BEGINNINGS OF NUCLEAR REGULATION 1946-1962 (1985) (the "official" history and an excellent discussion); F. SZASZ, THE DAY THE SUN ROSE TWICE: THE STORY OF THE TRINITY SITE NUCLEAR EXPLOSION JULY 16, 1945 (1984); P. WYDEN, DAY ONE: BEFORE HIROSHIMA AND AFTER (1984).

nuclear power. Although the public looked suspiciously upon military control of nuclear technology, the federal government was not removed from the regulatory process. Indeed, the federal government steered the course of nuclear technology through its infancy. The Atomic Energy Act of 1946[19] formally shifted control of nuclear development from the military to the civilian government. The 1946 Act strictly maintained the government monopoly over the control and use of nuclear energy, and ownership of nuclear reactors and fuels.[20] In addition, the Act attempted to keep secret all information about the development of nuclear power to prevent other countries from building nuclear bombs.[21] The attempt at secrecy failed, however, when both the Soviet Union and Great Britain detonated their own nuclear devices.

Very little development of commercial nuclear power occurred during the period 1946-1954. By 1953, however, the Eisenhower Administration, under pressure from scientists and business leaders, revised the nation's atomic energy policy and encouraged private commercial development through passage of the Atomic Energy Act of 1954.[22] The 1954 Act ended the federal government's monopoly over non-military uses of atomic energy and allowed private ownership of reactors under an Atomic Energy Commission (AEC) licensing procedure.

The 1954 Act, the bulk of which governs today, set the standards and the goals for development of commercial nuclear energy. Private sector public utilities were designated to take the lead and to run the reactors. Lewis Strauss, Chairman of the AEC, interpreted the policy behind the 1954 Act as a mandate to rely principally on private industry to develop civilian reactor technology. The first step, the Power Reactor Demonstration Program of 1955, was an attempt to involve private industry in a competitive program to test five separate reactor technologies. Government and private industry were to develop reactors jointly. Once the reactors were developed, government was to step out of the project and privately owned utilities were to assume fiscal responsibility.[23]

Private industry, however, was not receptive to bearing the financial burden of liability. The critical impediment was the possibility of a nuclear accident.[24] Officials of General Electric, one of the major reactor builders, threatened withdrawal from nuclear development activity, stating that the company would not proceed "with a cloud of bankruptcy

19. Ch. 724, 60 Stat. 755 (1946) (repealed 1954).

20. Ch. 724, 60 Stat. 760 (1946) (repealed 1954).

21. Ch. 724, 60 Stat. 766 (1946) (repealed 1954).

22. Pub. L. No. 83-703, 68 Stat. 936-37 (1954) (codified as amended in scattered sections of 42 U.S.C.).

23. G. MAZUZAN & J. WALKER, *supra* note 18, at 77-78.

24. *See* DEP'T OF ENERGY, PUB. NO. 6 DOE/EIA-0315, U.S. COMMERCIAL NUCLEAR POWER: HISTORICAL PERSPECTIVE, CURRENT STATUS AND OUTLOOK 6 (1982) [hereinafter cited as U.S. COMMERCIAL NUCLEAR POWER]. *See generally* G. MAZUZAN & J. WALKER, *supra* note 18, at 93-121.

hanging over its head."[25] In reaction, Congress passed the Price-Anderson Act of 1957[26] which limited the liability of the industry and assured some compensation for the public.

The Price-Anderson Act removed the last obstacle to private participation. Westinghouse executive Charles Weaver recalls, "We knew at that time that all questions [about safety risks] weren't answered. That's why we fully supported the Price-Anderson liability legislation. When I testified before Congress, I made it perfectly clear that we could not proceed as a private company without that kind of government backing."[27] Congressional hearings on the Price-Anderson Act revealed that there would be no commercial nuclear power plants built by the private sector without a financial safety net provided by the government.[28] The Act limits a public utility's financial exposure in the event of a nuclear accident to $560 million.[29]

The Price-Anderson Act's limitation on liability is a hard, and possibly tragic, policy choice.[30] Government estimates of damages caused by a core meltdown are $14 billion.[31] As of mid-1984, clean-up costs attributed to the accident at Three Mile Island exceeded $1 billion.[32] A $560 million liability limitation means that, once that amount is reached, people who live near, are served by, or have invested in the plant and suffer personal and property damage in excess of the ceiling amount must seek

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25. U.S. COMMERCIAL NUCLEAR POWER, *supra* note 24.

26. Pub. L. No. 85-256, 71 Stat. 576 (1957) (codified as amended in scattered sections of 42 U.S.C.).

27. M. HERTSGAARD, NUCLEAR, INC. 33 (1983).

28. *See* G. MAZUZAN & J. WALKER, *supra* note 18, at 93-121. *See generally Governmental Indemnity and Reactor Safety: Hearings Before the Joint Comm. on Atomic Energy*, 85th Cong., 1st Sess. 1 (1957).

29. The ceiling for liability for any single nuclear accident was set at $560 million in the original Price-Anderson Act. Pub. L. No. 256, 71 Stat. 576 (1957). This amount consisted of all the private insurance that the utilities could raise, which from 1957 to 1967 amounted to $60 million, with the government guaranteeing the remainder. Every ten years the Price-Anderson Act comes up for renewal. At present, the Act requires the utilities to be fully liable for the $560 million. Under the 1975 amendments, licensees are assessed $5 million per reactor, per incident. There are 80 reactors which together with $160 million of available private insurance equals a $560 million contribution by industry, essentially eliminating government participation. U.S. NUCLEAR REGULATORY COMM'N, THE PRICE-ANDERSON ACT—THE THIRD DECADE, NUREG-0957, I-1 to I-3 (1983).

30. *See* G. CALABRESI & P. BOBBITT, TRAGIC CHOICES (1978).

31. U.S. NUCLEAR REGULATORY COMM'N, REACTOR SAFETY STUDY: AN ASSESSMENT OF ACCIDENT RISK IN U.S. COMMERCIAL NUCLEAR POWER PLANTS, NUREG 75/014 (1975). These figures, contained in what is known as the Rasmussen Report, were criticized and another study was undertaken. The statistics in the Rasmussen Report were partially disproved, even though the study itself was accepted. U.S. NUCLEAR REGULATORY COMM'N, RISK ASSESSMENT REVIEW GROUP REPORT, NUREG/CR-0400 (1978). *See also* NUCLEAR ENERGY POLICY STUDY GROUP, NUCLEAR POWER ISSUES AND CHOICES 18 (1977) (estimating $10 billion in property losses alone) [hereinafter cited as NUCLEAR POWER ISSUES AND CHOICES].

32. *See* Diamond, *Problems Delay Three Mile Island Work*, N.Y. Times, July 25, 1984, at A12, col. 1. Douglas Bedell, communications manager for General Public Utilities, the owner of Three Mile Island, confirmed the $1 billion figure in a telephone interview on August 7, 1984. He also noted that this amount was limited to clean-up costs and did not include the cost of replacement power.

compensation from sources other than the plant operator. The liability limitation may encourage utilities to build plants without normal safeguards utilized by industries to avoid the costs of marketing a defective product. Such insulation from liability seems, and may well be, unfair but the Price-Anderson Act has been held constitutional.[33] The Act typifies the nature of nuclear power regulation. Government and industry have encouraged each other to participate in a long-term joint venture, through legislation which isolates them from normal market risks, while imposing those risks on the public.

Electric utilities did not begin to order reactors in any number until reactor manufacturers guaranteed plant prices. These reactor vendors, the manufacturers, needed to induce utilities to buy their product, and the inducement came in the form of "turnkey" contracts which placed all cost risks on the vendors.[34] For example, one manufacturer, General Electric, entered fixed price contracts for the design, manufacture, and construction of nine nuclear power plants.[35] Once a plant was built, regardless of cost overruns, the keys to the plant were turned over to the utility. The nine General Electric turnkey plants incurred total cost overruns of between $800 million and $1 billion.[36] Although manufacturers incurred large losses, the projects served their intended purpose of creating a market for nuclear power plants.

The allocation of risk between reactor manufacturers and utilities under turnkey contracts typifies the framework of the entire nuclear industry. The manufacturers viewed the turnkey contracts as loss leaders which would open the door to the emerging industry. An abnormal market was created, therefore, when utilities willfully relied on manufacturers to guarantee the costs of their plants. Limited market risks and lessened fiscal responsibility by the parties to turnkey contracts were made possible because the government was willing to absorb costs and protect the parties from extraordinary losses. When manufacturers assumed all risks until plants came on-line, utilities were insulated from responsibility for construction costs, much the same way that the Price-Anderson Act insulated the industry from liability risks. The practice of insulating the industry from risk also is inherent in the ratemaking process, which requires ratepayers to sustain utilities' decisions to overinvest in nuclear plants.[37] This pattern of financial protection, risk

33. Duke Power Co. v. Carolina Envtl. Study Group, Inc., 438 U.S. 59 (1978). The Act has been amended twice, once in 1967, then again in 1977 with slight modifications. As the Act comes up for renewal in 1987, debate has begun about how large the limitation of liability should be. *See, e.g.*, Nuclear Incident Liability Reform Act of 1981, H.R. 421, 98th Cong., 1st Sess. (1983) (proposed to increase industry's liability for nuclear accidents).

34. I.C. BUPP & J. DERIAN, *supra* note 18, at 48.

35. *Id.* at 49.

36. C. FLAVIN, NUCLEAR POWER: THE MARKET TEST 13 (1983).

37. Through ratemaking, public utilities are given an opportunity to earn a rate of return on their capital investments. Economists Harvey Averch and Leland Johnson have hypothesized that the

insulation, and loss shifting to other parties continues today, and contributes to the current failure of the domestic nuclear power industry.[38]

To promote the new market in nuclear power plants, originally encouraged through turnkey plants, reactor manufacturers cited their ability to build the plants, and persuasively asserted that the cost of nuclear fuel was cheaper than fossil fuels.[39] With these untested assurances, numerous electric utilities began entering into "cost-plus" contracts for nuclear power plants.[40] In contrast to the turnkey contract, the utilities agreed to pay for cost overruns for these plants. In what has been called the "Great Bandwagon Market" between 1965 and 1967, forty-nine plants totaling almost 40,000 megawatts of capacity were ordered under cost-plus contracts.[41] The nuclear industry's early years were built upon the utilities' hope that electricity would remain inexpensive, their faith that nuclear technology could be watched carefully, and their unquestioning reliance on the expectation that growth in the demand for electricity would continue.

What caused the surge of faith in nuclear power? First, the large growth rate in the demand for electricity, which averaged seven to eight percent per year from 1960-1972, was not expected to subside.[42] Second, the ability to realize economies of scale by building large plants of over 1,000 megawatts, and spreading the capital costs over large amounts of generated electricity contributed to the utilities' enthusiasm.[43] Third, the technical results of earlier, smaller reactors were encouraging.[44] Lastly, there was the lack of any credible challenge to nuclear power. The only segment knowledgeable enough to challenge nuclear power was the relatively small group of technicians involved in the development of nuclear power, and that group was not in a position to do so.[45] As a result

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ratemaking formula encourages plants to overinvest because the more they spend, the more they earn. *See* Averich & Johnson, *Behavior of the Firm Under Regulatory Constraint*, 52 AM. ECON. REV., Dec. 1962, at 1052.

38. *See, e.g.*, Cook, *Nuclear Follies*, FORBES, Feb. 11, 1985, at 82.

39. I.C. BUPP & J. DERIAN, *supra* note 18, at 49.

40. *Id.*

41. *Id.*

42. OFFICE OF TECHNOLOGY ASSESSMENT, PUB. NO. OTA-E-216, NUCLEAR POWER IN AN AGE OF UNCERTAINTY 29-30 (1984) [hereinafter cited as OTA REPORT]; Pierce, *The Regulatory Treatment of Mistakes in Retrospect: Canceled Plants and Excess Capacity*, 132 U. PA. L. REV. 497, 500-02 (1984).

43. The claim that nuclear energy was cheaper than coal was demonstrably true prior to Three Mile Island. Compared with a coal-fired unit, nuclear plants were cheaper to build and to operate. This assertion is no longer the case. *See* DEP'T OF ENERGY, PUB. NO. DOE/NE-0044, NUCLEAR ENERGY COST DATA BASE (1982) [hereinafter cited as NUCLEAR ENERGY COST DATA BASE]; OTA REPORT, *supra* note 42, at 57-71; Komanoff, Assessing the High Costs of New U.S. Nuclear Power Plants (June 1984) (paper on file with author); Perl, Estimated Costs of Coal and Nuclear Generation (Dec. 12, 1978) (paper on file with author).

44. U.S. COMMERCIAL NUCLEAR POWER, *supra* note 24, at 9.

45. I.C. BUPP & J. DERAIN, *supra* note 18, at 50.

of the utilities' faith, 144 reactors were ordered between 1970 and 1974.[46]

Given this climate of limited responsibility, health, safety, and environmental concerns were anathematic to nuclear regulators. A casual attitude toward environment, health, and safety remained until Congress passed the National Environmental Policy Act (NEPA) requiring environmental impact statements for all major federal activities.[47] After the AEC responded to NEPA by resisting its force unless ordered to comply by a federal court or Congress, a federal court held in 1971 that NEPA's provisions applied to the AEC.[48] The AEC subsequently drafted its own environmental provisions.[49]

Subtly, the temper of regulation changed. The public no longer was complacent about nuclear power safety and environmental claims made by industry and government. Although Congress left the 1954 enabling legislation essentially intact, except for the 1964 amendments,[50] the environmental movement made the public aware of radiological hazards.

Simply raising public consciousness about the dangers of radioactivity, however, proved to be an insufficient attack on nuclear power. The rate of demand for electricity was growing;[51] coal-burning facilities were an environmentally unattractive alternative;[52] and oil price hikes in the mid-1970's made nuclear power economically desirable.[53] Nuclear power was also given a prominent position in national energy plans.[54] Additionally, because decisionmaking power was centralized in Washington and more easily accessible to industry,[55] government and industry could easily continue their pro-nuclear policy, while downplaying safety and environmental questions.

Prior to the mid-1970's, government and industry promotion was further solidified as the financial community ignored anti-nuclear forces, and invested capital in what they considered a safe bet.[56] Yet, a rift in the government-industry relationship began to develop, reflecting a trade-off

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46. U.S. COMMERCIAL NUCLEAR POWER, *supra* note 24, Table 1, at 10.

47. 42 U.S.C. §§ 4321-4370 (1982).

48. Calvert Cliff's Coordinating Comm., Inc. v. United States Atomic Energy Comm'n, 449 F.2d 1109 (D.C. Cir. 1971).

49. 10 C.F.R. § 51 (1984).

50. The 1964 amendments included The Private Ownership of Special Nuclear Materials Act, Pub. L. No. 88-489, 78 Stat. 602 (1964), which gave private industry more control over nuclear fuel.

51. *See* L. HYMAN, AMERICA'S ELECTRIC UTILITIES, PAST, PRESENT AND FUTURE 89-98 (2d ed. 1985).

52. *See* B. ACKERMAN & W. HASSLER, *supra* note 8.

53. W. FOX, FEDERAL REGULATION OF ENERGY §§ 6.01-6.04 (1983).

54. Under President Nixon's Project Independence, nuclear power was to provide more of our energy needs. *The Energy Emergency*, 9 WEEKLY COMP. PRES. DOC. 1312-22 (Nov. 7 and 8, 1973). President Ford continued Project Independence, calling for a program to build 200 additional nuclear plants. *Energy Future*, the widely-read report of an energy project at the Harvard Business School, attributed a 7% share of all energy production to nuclear power. *See* R. STOBAUGH & D. YERGIN, ENERGY FUTURE 10 (1979).

55. *See, e.g.*, J. CHUBB, *supra* note 18, at 89-125.

56. *See* L. HYMAN, *supra* note 51, at 99-116.

between safety and finances, and a conflict between politics and markets. The rift was first manifested in a bureaucratic realignment. At its inception, the AEC had potentially conflicting functions: promoting the use of nuclear technology and, at the same time, ensuring that the technology was applied safely.[57] In 1974, realizing the cross-purposes of both promotion and safety oversight, Congress split the AEC. It created in its place the Nuclear Regulatory Commission (NRC), an independent agency responsible for safety and licensing, and the Energy Research and Development Administration (ERDA), later absorbed by the Department of Energy, responsible for promotion and development of nuclear power.[58]

The division and dissolution of the AEC had little immediate impact on nuclear power development because the promotional pattern had been set and the NRC continued the task. Furthermore, the split did not eliminate a basic regulatory conflict. The NRC had a promotional responsibility through its licensing process and, at the same time, a safety responsibility through plant oversight.[59] If the NRC too vigorously exercised its safety role, the attendant compliance costs would act as a disincentive to invest in nuclear plants and cut across the NRC's promotional grain.

The NRC's emphasis on promotion continued until the nuclear accident at Three Mile Island (TMI). After the 1979 accident, the NRC increased safety inspections,[60] stepped up enforcement,[61] developed backfitting and emergency preparedness rules,[62] and adopted a more safety-conscious attitude. This attitude was more costly to the industry and was a clear departure from past practices. As costs rise, demand decreases. Thus, it was not much after TMI that the NRC, as a result of industry pressure and as an exercise in bureaucratic self-preservation,

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57. The basic regulatory conflict was established in the Atomic Energy Act of 1954, Pub. L. No. 83-703, 68 Stat. 936-37 (1954) (codified as amended in scattered sections of 42 U.S.C.).

58. Energy Reorganization Act of 1974, Pub. L. No. 93-438, 88 Stat. 1233 (codified as amended at 42 U.S.C. §§ 5801-5879 (1982)).

59. W. Fox, *supra* note 53, at § 22.05.

60. *See, e.g.*, Nuclear Regulatory Comm'n, Report of the NRC Evaluation Team on the Quality of Construction at the Zimmer Nuclear Power Station, NUREG-0969 (1983). The NRC's safety evaluations of the Zimmer plant typify how routine safety evaluations were conducted prior to Three Mile Island (TMI). After TMI, as a result of public reaction, workers and NRC safety inspectors increased their safety awareness for a period. *Id. See also* Office of Inspection and Enforcement, Nuclear Regulatory Comm'n, Report to Congress in Improving Quality and the Assurance of Quality in the Design and Construction of Commercial Nuclear Power Plants (1984).

61. The NRC publishes a quarterly report entitled: Enforcement Actions: Significant Actions Resolved, NUREG-0940. Over the last decade, there has been an increase in the number and the amounts of fines.

62. *See* Revision of Backfitting Process for Power Reactors, 48 Fed. Reg. 44217 (1983) (to be codified at 10 C.F.R. § 50.109). Off-site emergency preparedness did not become an issue until after TMI. These regulations have been the primary reason for the Shoreham plant's failure to open. *See* County of Suffolk v. Long Island Lighting Co., 728 F.2d 52, 56 (2d Cir. 1984), discussed *infra* text accompanying notes 210-18.

began to study cost-reduction measures and to move back to its pro-industry position.[63]

According to the most prevalent energy scenario, nuclear power is crucial for an energy transition from non-renewable to renewable resources, and from the "hard" to the "soft" paths.[64] The energy mix is dependent on two basic energy forms, petroleum and electricity. There is limited cross-substitutability between these two forms. Although oil and natural gas can be used to burn boilers, creating steam which turns turbines to generate electricity, the country cannot afford to devote precious oil and gas reserves to that purpose. Indeed, utilities are prohibited by law from constructing new power plants fueled by oil or natural gas.[65] Oil is better used in the transportation sector. Electricity, because it cannot be stored, has little usefulness for transportation, aside from inner-city mass transit, and is therefore used mainly for heating, cooling, lighting, and industrial purposes. Furthermore, since oil and gas reserves are becoming more difficult to locate, explore, and develop, oil and gas are increasingly more expensive, and nuclear power more attractive.[66] Since nuclear energy is cost competitive and nearly inexhaustible, it can assume a key transitional role as the country moves to renewable energy.[67]

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63. As a countervailing measure, the NRC has attempted to reduce costs by streamlining the licensing process. *See* NUCLEAR REGULATORY COMMISSION, REGULATORY REFORM TASK FORCE, DRAFT REPORT SECY-82-447 (1982) [hereinafter cited as REGULATORY REFORM TASK FORCE]. *See also* UNION OF CONCERNED SCIENTISTS, SAFETY SECOND: A CRITICAL EVALUATION OF THE NRC'S FIRST DECADE (1985) (arguing that within two to three years of TMI, the NRC reverted to its promotional policy) [hereinafter cited as SAFETY SECOND].

64. For a discussion of hard and soft paths, see A. LOVINS, SOFT ENERGY PATHS: TOWARD A DURABLE PEACE 26-28, 38-46 (1977) (differentiating hard energy paths, which rely upon expansion of centralized high technologies to create energy supplies, from soft energy paths, which combine a serious commitment to the efficient use of energy with rapid development of renewable energy sources).

65. Powerplant and Industrial Fuel Use Act of 1978, Pub. L. No. 95-620, 92 Stat. 3289.

66. In 1970, petroleum sold for $6.70 per barrel (in 1982 dollars). In 1980, it climbed to a high of $39.30 per barrel (in 1982 dollars), a five-fold increase within a decade. OFFICE OF POLICY, PLANNING AND ANALYSIS, DEP'T OF ENERGY, PUB. NO. DOE/PE-00292, ENERGY PROJECTIONS TO THE YEAR 2010, Table 3-1, at 32 (1983). More recently, in 1986 petroleum sold for approximately $10 per barrel. Natural gas prices have skyrocketed and dipped similarly. During 1970-1980, the price of one-thousand cubic feet of natural gas rose from $.53 to $2.73. STATISTICAL ABSTRACT OF THE UNITED STATES, Table 986, at 578 (1984).

67. This portrait is not without blemishes. Recent estimates of capital investment for electric generation show nuclear energy to be more costly than coal, oil, or gas. The estimated cost of constructing a nuclear plant in the year 1995, per kilowatt hour (/kWh), is $3900/kWh compared with $2700-2900/kWh for coal, $2300/kWh for oil, and $1700/kWh for natural gas. NUCLEAR ENERGY COST DATA BASE, *supra* note 43, at 20. The most likely substitute for nuclear generated power is coal because of its abundance. Nevertheless, coal is a very problematic resource. Its known dangers include black lung disease and accidental mining deaths. Uncertain dangers include the possibility of atmospheric cataclysm due to carbon dioxide buildup, or ecological destruction due to acid rain. *See* W. FOX, *supra* note 53, at § 25.12. Like nuclear power, coal has promise because it is plentiful and, given certain assumptions, is cost competitive; unlike nuclear power, coal is readily exhaustible.

The risks of nuclear power lie in contemplation of a low probability, high risk event. The health

Currently, nuclear power generates approximately thirteen percent of the country's electricity and about four percent of all energy needs.[68] Nuclear power came to play such a prominent role because it was cost competitive and because its safety risks were discounted. The higher price of electricity generated from power plants using oil increased the financial attraction of nuclear power.[69] However, the increase in demand for electricity, which was rising at seven to eight percent per year in the 1960's, fell to the level of one to three percent per year by the late 1970's and early 1980's, with a two percent decline in 1982.[70] High electric bills and the recession caused many persons to conserve. Economic forecasters were surprised at the elasticity of demand for electricity relative to price hikes.[71] The immediate pressure to increase capacity vanished and projections for more plants into the turn of the century diminished.[72] Demand was down, prices were up, and utilities were running well below capacity.[73]

The nuclear power industry began to struggle in the late 1970's. By the end of 1983, over 100 scheduled nuclear power plants had been cancelled; some were cancelled even after construction began.[74] Estimates of costs relating to expenditures on discontinued nuclear plants ranged into the billions of dollars.[75] These cancellations, their costs, and the resulting regulatory response are the central problems of the second transition.

Beginning in the 1950's the federal government, in its determination to promote the use of nuclear technology for commercial use, forged a strong and protective partnership with private sector utility owners, equipment

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and safety effects of a nuclear accident are not known because, fortunately, we do not have the necessary data and experience to test conflicting hypotheses. It is nuclear power's abundance which makes it such an important transitional resource.

68. ENERGY INFORMATION AGENCY, PUB. NO. DOE/EIA-0384(84)3, ANNUAL ENERGY REVIEW 1984 (1985).

69. Pierce, *supra* note 42, at 501.

70. *Id.* at 502.

71. *See id.* at 505.

72. *Id.* at 503.

73. Many utilities are experiencing excess capacity rates of approximately 33%. Assuming that a reserve margin of 20% is reasonable, a plant with such excess capacity is 13% inefficient. How long the excess capacity will last is not easily determined. First, demand projections are difficult to calculate. Second, demand elasticity in response to price increases is difficult to ascertain. Third, the number of plants that will be retired, and new ones that will come online, is not fixed. *See* OTA REPORT, *supra* note 42, at 31-45; Pierce, *supra* note 42, at 511-17, 538-41; Colton, *Excess Capacity: Who Gets the Change From the Power Plant*, 34 HASTINGS L.J. 1133 (1983).

74. *See* Komanoff, *supra* note 43, at 1.

75. The DOE estimates abandonment costs at $8.1 billion in its worst case study. U.S. DEP'T OF ENERGY, PUB. NO. DOE/EIA-0392, NUCLEAR PLANT CANCELLATIONS: CAUSES, COSTS, AND CONSEQUENCES, Table ES4, xxi (1983). The estimate is low even in a worst case. Economist Charles Komanoff estimates that the national economic damage caused by nuclear abandonment is $65-100 billion. This figure includes $15 billion invested in cancelled plants; $20-40 billion in plants likely to be cancelled; and $30-40 billion attributable to plants with large cost overruns. Komanoff, *supra* note 43, at 1. *See also* Hertsgaard, *Nuclear Power: Too Costly to Save*, N.Y. Times, June 24, 1984, at § F3, col. 1.

vendors, and plant contractors. Both the principal private and public sector participants were interested in the rapid growth of the commercial nuclear power industry. Industry's interest in profit maximization and government's interest in expanding the development of nuclear technology through commercialization may have precluded a cautious approach. In retrospect, neither partner seems to have been able to foresee costly environmental and safety problems associated with nuclear electricity generation. The financial arrangement between government and industry further reinforced a promotional policy. The private sector was insulated from liability on normal market risks and the government could spread its costs among the taxpayers. This policy changed only after the TMI accident.

B. *Financial Fallout*

On March 28, 1979, a series of mechanical and operator failures combined to create deadly radioactive conditions in the No. 2 Unit (TMI-2) of General Public Utility's Three Mile Island plant near Harrisburg, Pennsylvania.[76] These failures, known as common-mode failures,[77] and the events that followed are commonly referred to as the accident at Three Mile Island. According to engineering estimates prepared by a special NRC study group, TMI-2 was within thirty to sixty minutes of a core meltdown on March 28, 1979.[78]

A core meltdown, colloquially referred to as the China Syndrome, is a nuclear accident in which a generator's molten reactor core melts through thousands of tons of concrete and steel encasing the fuel rods and burns its way into the ground, emitting radioactive gas into the air and contaminating underground water tables. The radioactivity from a core meltdown could cause immediate death and illness as well as latent fatalities and

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76. For a complete description of the nuclear accident at Three Mile Island, see D.F. FORD, THREE MILE ISLAND: THIRTY MINUTES TO MELTDOWN 16-34 (1982). *See generally* REPORT TO THE PRESIDENT'S COMM'N ON THE ACCIDENT AT THREE MILE ISLAND (1979), also known as the Kemeny Commission Report [hereinafter cited as REPORT TO THE PRESIDENT'S COMM'N].

77. A "common-mode" failure is explained by one author:

> A cardinal rule for the designers of commercial nuclear power plants is that all systems essential to safety must be installed in duplicate, at least, so that if some of the apparatus fails, there will always be enough extra equipment to keep the plant under control. Federal regulations governing the industry require strict conformity to this prudent design philosophy. Even when this rule is applied, however, there is a type of accident that can jeopardize the safety of a nuclear plant. This type of accident involves what is known as a common-mode failure, a single event or condition that can cause simultaneous multiple malfunctions resulting in the major disruption of the plant's safety systems.

D.F. FORD, *supra* note 76, at 13. The idea that an unplanned occurrence can overcome multiple precautions typifies not only nuclear plant technology, but nuclear regulation as well. With the accident at TMI, a new era in commercial nuclear policy began, recognizing that no completely safe nuclear power system existed and that human error can undermine even the most rigorous safety precautions.

78. *Id.* at 33.

genetic defects. Economic losses could also amount to billions of dollars.[79]

As frightening as the vision of a core meltdown is, the irony of TMI is that it caused a shift in focus from the safety factors to the financial consequences of a nuclear incident. Because of the accident at TMI, both units, TMI-1 and TMI-2, were shut down.[80] The clean-up of TMI-2 has cost over one billion dollars,[81] a far greater sum than previous estimates for partial plant discommissioning.[82] Litigation costs have been substantial for the plant's owner-operator,[83] including claims against it from those who suffered psychological damages.[84] Collectively, the events at TMI signaled the beginning of a new era for the commercial nuclear power industry and for its partner, the federal government. This era can be summarized by a question: Who pays?

The nuclear power industry has been brought to a halt primarily by market forces which reflect the economic uncertainty inherent in building and operating a nuclear power plant. Thus, these market forces have had direct policy and regulatory consequences. Even before the TMI acci-

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79. *See supra* note 31.

80. TMI-2 remains shut. Recently, TMI-1 received permission from the NRC to restart. *See In re* Three Mile Island Alert, Inc. v. United States Nuclear Regulatory Comm'n, 771 F.2d 720 (3d Cir. 1985).

81. *See supra* note 32.

82. Plant decommissioning can be accomplished in two ways. The obsolete plant can either be buried in concrete or dismantled. NRC regulations for decommissioning are contained in 10 C.F.R. § 50.82 (1985). A plant decommissioning was estimated to cost an average of $133 million per plant in 1983 dollars, based on studies compiled by the utility industry. Buta & Palmer, *An Analysis of Decommissioning Cost Estimates for Nuclear Operating Plants*, PUB. UTIL. FORT., July 19, 1984, at 47. Because of problems with waste disposal, decommissioning a plant may cost more than building it. *See, e.g.*, Ferguson, *Financial Aspects of Power Reactor Decommissioning*, 1980 IOWA STATE UNIVERSITY PROCEEDINGS BY REGULATORY CONFERENCE 471-85.

83. The TMI accident has generated litigation in federal and state courts. *See* Metropolitan Edison Co. v. People Against Nuclear Energy, 460 U.S. 766 (1983) (NRC is not required to include psychological damages as part of its environmental assessment); Pennsylvania v. General Pub. Util. Corp., 710 F.2d 117 (3d Cir. 1983) (although suits by private litigants are precluded in federal court under the Atomic Energy Act, state law is available); General Pub. Util. Corp. v. Babcock & Wilcox, 547 F. Supp. 842 (S.D.N.Y. 1982) (owner-operator better able to allocate risk among customers than was manufacturer of nuclear facility); Susquehanna Valley Alliance v. Three Mile Island Nuclear Reactor, 485 F. Supp. 81 (M.D. Pa. 1979) (plaintiffs in environmental suit must exhaust administrative remedies before filing a claim in federal district court); Pennsylvania Elec. Co. v. Pennsylvania Pub. Util. Comm'n, 78 Pa. Commw. 402, 467 A.2d 1367 (1983) (proper for state utility commission to exclude costs relating to shutdown of nuclear reactor in setting rates). The Price-Anderson Act, Pub. L. No. 85-256, 71 Stat. 576 (1957), discussed *supra* notes 26-29 and accompanying text, established an insurance pool for victims of nuclear incidents. Of the $30 million spent from the fund since 1957, approximately $28 million was allocated to TMI claims including $1.4 million in living expenses for pregnant women and pre-school children who evacuated the area at the Governor's suggestion; $20 million for economic harm to businesses and individuals; $5 million for a Public Health Fund; and $2.5 million for attorney's fees and expenses. U.S. NUCLEAR REGULATORY COMM'N, THE PRICE-ANDERSON ACT—THE THIRD DECADE, NUREG-0957, I-6 to I-7 (1983).

84. In Metropolitan Edison Co. v. People Against Nuclear Energy, 460 U.S. 766 (1983), the Supreme Court held that NEPA did not require the NRC to assess the possibility of psychological damages in a licensing proceeding.

dent, the nuclear power industry was on the decline.[85] No new plants have been ordered since 1978 and since 1974 more than 100 plants have been cancelled or postponed.[86] Even plants under construction have been cancelled or converted to burning fossil fuels, especially coal.[87] Most of these plants, in addition, are experiencing unanticipated postponements. These cancellations and conversions demonstrate the lack of faith that utility managers and investors now have in the industry. This loss of faith may be only temporary.[88] Nevertheless, these setbacks affect future nuclear policy and have also influenced the wider field of energy policy and politics, as well as the legal response to energy policies.[89]

The first characteristic of the transitional phase is the emphasis on financial and market needs. As attention has focused on the financial fallout of nuclear policy, safety issues have been a secondary concern, even though the safety of nuclear power plants is integrally connected to financial matters. As costs have risen, regulatory bodies have been under pressure to relax safety standards.[90] Increased expenses due to plant decommissioning or waste disposal are directly attributable to health and safety factors. Efforts to streamline the regulatory process or to ease plant construction should not be established, however, at the expense of these

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85. In 1960, the government predicted that 1,500 nuclear plants would be operating by the year 2000. By the mid-1970's that projection had dropped to 400 plants. By 1981, after the TMI accident, only 78 additional plants were forecast. In 1984 the Union of Concerned Scientists, using information gathered from the Nuclear Regulatory Commission, the Department of Energy, and the Atomic Industrial Forum, estimated that approximately 50 new plants will be added to the 77 plants already in operation. *See* NUCLEAR POWER PLANTS IN THE UNITED STATES: CURRENT STATUS AND STATISTICAL HISTORY (1984); *see also* OTA REPORT, *supra* note 42, at 29-82; U.S. COMMERCIAL NUCLEAR POWER, *supra* note 24, at 16-17; U.S. DEP'T OF ENERGY, PUB. NO. DOE/EIA-0392, NUCLEAR PLANT CANCELLATIONS: CAUSES, COSTS, AND CONSEQUENCES 3-17 (1983) [hereinafter cited as NUCLEAR PLANT CANCELLATIONS].

86. UNION OF CONCERNED SCIENTISTS & NEW YORK PUBLIC INTEREST GROUP, THE INDIAN POINT BOOK 7 (1982) [hereinafter cited as THE INDIAN POINT BOOK].

87. Perhaps the most notable conversion project is the Zimmer power station outside of Cincinnati, Ohio. This plant was alleged to have been 97% complete after the expenditure of $1.7 billion. Because Ohio does not allow the pass through of cancellation costs, the pressure to convert has caused the utilities to seek conversion. *See In re* Restatement of the Accounts and Records of the Cincinnati Gas & Elec. Co., UTIL. L. REP. (CCH) ¶ 24,963 (Ohio P.U.C., Nov. 26, 1985).

88. *See, e.g.*, OTA REPORT, *supra* note 42, at 3. The assertion that the problems of the nuclear industry are temporary is an attempt at realism which does not examine a non-nuclear scenario. The future of nuclear power can be conceived and analyzed in two scenarios. Plants constructed from the early 1960's to the present will continue to need maintenance and supervision, and several dozen plants remain to be brought on line. Additional plants are not planned but new plants could be ordered if there is an unanticipated growth in electrical demand, a major energy supply disruption, legislation restricting coal fuel plants, or nuclear plant standardization with pre-approved sites. *See, e.g.*, TECHNOLOGY FUTURES, INC. & SCIENTIFIC FORESIGHT, INC., PRINCIPLES FOR ELECTRIC POWER POLICY 25-26 (1984). A non-nuclear future is also a possibility. *See, e.g.*, UNION OF CONCERNED SCIENTISTS, A SECOND CHANCE: NEW HAMPSHIRE'S ELECTRICITY FUTURE AS A MODEL FOR THE NATION (1983); Lovins, *Saving Gigawatts with Negabucks*, PUB. UTIL. FORT., March 21, 1985, at 19.

89. Tomain, *Electricity and Ideology*, ___ J. ENERGY LAW & POL. ___ (forthcoming 1986).

90. Wald, *Nuclear Agency Calls Cost Pinch a Possible Factor in Ohio Reactor Accident*, N.Y. Times, July 23, 1985, at B16, col. 1.

factors. The present financial weakness of the nuclear industry should not be used as an excuse to downgrade health or safety regulations.[91] Such a trade-off is made even more macabre by the interconnection between nuclear power plants and nuclear weapons.[92]

Because the TMI accident came so close to a core meltdown, the emphasis on finance over safety is paradoxical, even though a shift in the debate from claims about safety risks to one about money and cost allocation is oddly assuring. The comfort is derived from the awareness that a more careful approach to promoting nuclear technology is needed as a result of financial dislocation. Health, safety, and financial issues are best resolved through a politically and ethically responsive decisionmaking process.[93] Financial and regulatory communities are beginning to recognize a new political dimension in the process of spreading abandonment costs. Decisionmaking power is being diffused in response to political pressures. Nuclear power decisions are being made not only by the federal government but also by the states.[94] The new era of nuclear power regulation is thus distinguished by the decentralization of decisionmaking authority.

C. *Decentralization and Federalism*

The leading case that recognizes the states' role in nuclear decisionmaking is the 1983 United States Supreme Court decision *Pacific Gas & Electric Co. v. State Energy Resources Conservation & Development Commission*.[95] The move toward decentralization had to overcome a history of decisionmaking controlled by the federal government. Public disillusionment with nuclear power grew out of frustration from the lack of available and quantifiable information. Determining the safety,

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91. *See, e.g.*, THE INDIAN POINT BOOK, *supra* note 86; Diamond, *The Heat Is Still Rising on Nuclear Regulators*, N.Y. Times, July 29, 1984, at D24, col. 4; Wald, *Panel Concedes Erring in Permit for Atom Plant*, N.Y. Times, July 24, 1984, at A10, col. 1; Van Loon & Weiss, *The State of the Nuclear Industry and the NRC, A Presentation of the Union of Concerned Scientists to the Nuclear Regulatory Commission* 4-9 (Nov. 17, 1983). The safety-financial exchange is consistent with the currently popular methodology of cost-benefit analysis. An over-reliance on cost-benefit data fails to deal with an important, non-quantifiable assumption that nuclear power is worth its risks at any price. Risk assessment must be part of the overall decisionmaking process.

92. Nuclear power and nuclear weapons are connected because the same technology is used to create both. As nuclear materials and technology have moved from government to private control, and as these materials are traded more liberally on world markets, the likelihood of nuclear accidents increases. *See, e.g.*, NUCLEAR POWER ISSUES AND CHOICES, *supra* note 31, at 271-99; A.B. LOVINS & H. LOVINS, BRITTLE POWER: ENERGY STRATEGY FOR NATIONAL SECURITY 141-68 (1982).

93. *See generally* B. FISCHHOFF, S. LICHTENSTEIN, P. SLOVIC, S. DERBY & R. KEENEY, ACCEPTABLE RISK (1981) (analyses and recommendations for improving acceptable risk of decisionmaking) [hereinafter cited as B. FISCHHOFF]; W. LOWRANCE, OF ACCEPTABLE RISK: SCIENCE AND THE DETERMINATION OF SAFETY 75-126 (1976) (making decisions when safety issues are perceived as public problems); H. JONAS, THE IMPERATIVE OF RESPONSIBILITY (1984) (a philosophical overview of the problems of risk-taking and responsibility).

94. *See infra* text accompanying notes 95-135.

95. 459 U.S. 817 (1983).

environmental and health risks of nuclear power is difficult. Most of the information needed to make informed decisions has been controlled by the industry. Decisionmaking power was centralized in such a way that utilities seemed to enjoy a privileged relationship with the regulators.[96] Citizens have had little or no effective voice in the central regulation of this complex industry. One source of hope for a citizens' voice in nuclear policymaking rests with the state governments. State legislators may be more responsive when it is too costly, cumbersome, and difficult for citizens to organize and lobby in Congress. However, the Supremacy Clause of the United States Constitution[97] presents a significant barrier to a state-initiated response to nuclear power. Even when anti-nuclear forces have been successful in converting state legislators to their cause and in passing industry oversight legislation, constitutional law requires that federal regulations preempt contrary state laws. Federal preeminence had been especially dominant in the nuclear field.[98]

Both the early history of nuclear power regulation and the nature of the nuclear industry made a persuasive case for centralized regulation. Development of this complicated, costly, and potentially dangerous technology could not, in a democracy, be left to a military establishment primarily interested in its use in weaponry. Nor could the private sector transfer the technological advances gained during World War II to commercial use without substantial guidance. Nuclear power's properties and dangers were untested and unknown, and the private sector could not afford to underwrite the market risks involved. Government support and oversight were necessary. Accordingly, the commercial nuclear power industry grew into a large, complex, controversial and publicly sponsored enterprise which relied on the concentrated, bureaucratic decisionmaking powers of the federal government. Such centralized federal decisionmaking, through the AEC, made possible the transition to commercial use during the 1950's and 1960's. Nevertheless, centralization has also contributed to the downfall of sound nuclear policy in the 1970's and 1980's.[99]

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96. *See, e.g.*, J. CHUBB, *supra* note 18, at 89-125.

97. U.S. CONST. art. VI, cl. 2.

98. For preemption cases in the nuclear field, see Illinois v. General Elec. Co., 683 F.2d 206 (7th Cir. 1982) (Illinois Spent Fuel Act which restricted disposal or storage of nuclear fuel held to be preempted by the Atomic Energy Act of 1954), *cert. denied*, 461 U.S. 913 (1983); United Nuclear Corp. v. Cannon, 553 F. Supp. 1220 (D.R.I. 1982) (Rhode Island statute requiring utility to post $10 million bond for nuclear waste disposal invalidated); United States v. Washington, 518 F. Supp. 928 (E.D. Wash. 1981) (Atomic Energy Act preempts Washington's Radioactive Waste Storage and Transportation Act), *aff'd*, 684 F.2d 627 (9th Cir. 1982), *cert. denied*, 461 U.S. 913 (1983); United States v. City of New York, 463 F. Supp. 604 (S.D.N.Y. 1978) (New York City precluded from licensing and regulating reactors); Van Dissel v. Jersey Central Power & Light Co., 181 N.J. Super. 516 (App. Div. 1981) (Atomic Energy Act preempts tort action for damages caused by thermal pollution), *appeal denied*, 89 N.J. 409, 438 A.2d 563 (1982), *judg. vacated, case remanded*, 104 S. Ct. 989 (1984).

99. Centralization cuts off state and citizen participation in decisionmaking at an unacceptably

Early nuclear power cases reflect scant concern about energy, environmental and safety costs, and depict confidence in the powers of central administration. In 1961, the Supreme Court affirmed the power of the AEC to grant a construction license for a breeder reactor plant. In *Power Reactor Development Co. v. International Union of Electrical, Radio & Machine Workers*,[100] Justice Brennan commented favorably on the decisionmaking and policymaking authority of the AEC:

> The Commission, furthermore, had good reason to make this distinction. For nuclear reactors are fast-developing and fast-changing. What is up to date now may not, probably will not, be as acceptable tomorrow. Problems which seem insuperable now may be solved tomorrow, perhaps in the very process of construction itself. We see no reason why we should not accord to the Commission's interpretation of its own regulation and governing statute that respect which is customarily given to a practical administrative construction of a disputed provision.[101]

Justice Brennan also addressed the "fears of nuclear disaster which respondents so urgently place before us,"[102] by deferring to the Commission and stating: "We cannot assume that the Commission will exceed its powers, or that these many safeguards to protect the public interest will not be fully effective."[103]

Power Reactor Development Co. is part of a consistent and dominant pattern in the fabric of administrative law. Federal courts defer to administrative agencies for numerous reasons. The doctrine of separation of powers and the system of checks and balances established by the Constitution[104] support a policy of deference. Congress, a more representative branch than the judiciary, creates an agency and delegates to it authority to administer within the field. Thus, as a matter of constitutional law, courts grant agencies much leeway. Congress, in creating the AEC, delegated to it the authority and responsibility for administering commercial nuclear power. Arguably, the agency is the specialist and has the expertise, hence the competence, to decide issues peculiar to its charge. The courts simply are not well equipped to second-guess the expert body on factual or policy questions.[105] Courts are, nevertheless,

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high level. A manifestation of the loss of decisionmaking legitimacy by centralized decisionmakers is the amount of legislation enacted to protect consumers for over-investment in nuclear plants. *See, e.g.*, Olson, *Statutes Prohibiting Cost Recovery for Cancelled Nuclear Plants: Constitutional? Pro-Consumer?*, 28 J. URB. & CONTEMP. L. 345 (1985).

100. 367 U.S. 396 (1961).

101. *Id.* at 408.

102. *Id.* at 414.

103. *Id.* at 415-16.

104. *See generally* Strauss, *The Place of Agencies in Government: Separation of Powers and the Fourth Branch*, 84 COLUM. L. REV. 573 (1984).

105. A constant debate exists among scholars and within the judiciary on the scope of judicial review of administrative action in the scientific area. *Compare* Leventhal, *Environmental Decisionmaking and the Role of the Courts*, 122 U. PA. L. REV. 509, 510 (1974) *with* Bazelon, *Coping With Technology Through the Legal Process*, 62 CORNELL L. REV. 817, 822-23 (1977), for the views of

obligated to decide questions of law, and to interpret constitutional and statutory provisions and the meaning of the terms of agency actions. Courts are also required to compel agency actions which have been unlawfully delayed and to set aside agency actions which are arbitrary, capricious, or unconstitutional, which exceed statutory authority, or which are found not to be in observance of procedure.[106] The courts are also required to set aside agency factual findings which are not supported by substantial evidence.[107] Consequently, the Supreme Court's ruling reinforced the power of the AEC to direct the country's nuclear program.

The next major nuclear case dealt directly with preemption. The constitutionality of a Minnesota regulation was at issue in *Northern States Power Co. v. Minnesota*.[108] The state regulation imposed more stringent conditions on the release of radioactive waste from a nuclear power plant than did AEC regulations. In broad language the Court of Appeals held:

> [T]he federal government has exclusive authority under the doctrine of preemption to regulate the construction and operation of nuclear power plants, which necessarily includes regulation of the levels of radioactive effluents discharged from the plant.[109]

The United States Supreme Court affirmed *Northern States Power* without opinion.[110] Technically, the only thing that can be inferred from the affirmance is that at least a plurality of Justices agreed with the lower court's result.[111] Nevertheless, the Supreme Court settled the practice of deference to a centralized nuclear agency.

Pacific Gas & Electric Co. v. State Energy Resources Conservation & Development Commission[112] upset the federal government's exclusive

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two distinguished jurists on the question of how much deference is due agencies in highly technical areas. *See also* Rodgers, *A Hard Look at* Vermont Yankee: *Environmental Law Under Close Scrutiny*, 67 GEO. L.J. 699, 701 (1979); Rodgers, *The Natural Law of Administrative Law*, 48 MO. L. REV. 101, 104 (1983). Professor Joel Yellin argues that courts are not equipped to second guess agencies in the area of nuclear power and that special masters might perform the task better. *See* Yellin, *High Technology and the Courts: Nuclear Power and the Need for Institutional Reform*, 94 HARV. L. REV. 489, 555 (1981) [hereinafter cited as Yellin, *High Technology*]. Professor Yellin has also suggested the creation of a hybrid executive-legislative institution through which techno-scientific policy positions can be recommended to Congress, as well as a science advisory board for the judiciary. *See* Yellin, *Science, Technology, and Administrative Government: Institutional Designs for Environmental Decisionmaking*, 92 YALE L.J. 1300, 1326-28 (1983) [hereinafter cited as Yellin, *Institutional Designs*].

106. 5 U.S.C. § 706 (1982).

107. *Id.*

108. 447 F.2d 1143 (8th Cir. 1971), *aff'd mem.*, 405 U.S. 1035 (1972).

109. 447 F.2d at 1154.

110. 405 U.S. 1035 (1972). Justices Douglas and Stewart dissented from the affirmance. *Id.*

111. Summary affirmances are " 'not to be read as an adoption of the reasoning supporting the judgment under review.' " Pacific Gas & Elec. Co. v. State Energy Resources Conservation & Dev. Comm'n, 461 U.S. at 212 n.24 (quoting Zobel v. Williams, 457 U.S. 55, 64 n.13 (1982); Mandel v. Bradley, 432 U.S. 173, 176 (1977)).

112. Pacific Gas & Elec. Co. v. State Energy Resources Conservation & Dev. Comm'n, 461 U.S. 190 (1983).

control in the province of nuclear energy. In 1976, the California legislature amended the state's Warren-Alquist Act[113] and conditioned the construction of nuclear plants on the finding that adequate storage and disposal facilities are available for nuclear waste.[114] California's amendment imposed a moratorium on new nuclear plants until a disposal method is found.[115] Pacific Gas & Electric Company brought suit[116] alleging that sections of the state legislation were preempted by the Atomic Energy Act of 1954,[117] which authorizes states to regulate nuclear power plants "for purposes other than protection against radiation hazards."[118] The Court of Appeals for the Ninth Circuit held that such other purpose was the state's protection of its economic interests since "uncertainties in the nuclear fuel cycle make nuclear power an uneconomical and uncertain source of energy."[119]

The Supreme Court opinion, written by Justice White, upheld the appellate court's refusal to preempt, and sustained the constitutionality

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113. Warren-Alquist State Energy Resources Conservation and Dev. Act, CAL. PUB. RES. CODE §§ 25000-25986 (West 1977 & Supp. 1981).

114. Warren-Alquist Act, CAL. PUB. RES. CODE § 25524 (West 1977 & Supp. 1981). The waste disposal problems of nuclear reactors are at crisis proportions. Nuclear wastes are highly toxic. Harmful radioactive waste lasts thousands, to hundreds of thousands, of years. Radiation levels and half-life expectancies depend on the nature of the nuclear byproduct. A contaminated reactor, for example, can emit low-level radiation with negligible health or environmental effects. Plutonium, at the other extreme, is the most highly toxic element known and has a half-life of 24,000 years. *See* Green & Fridkis, *Radiation and the Environment*, in FEDERAL ENVIRONMENTAL LAW 1022, 1023-26 (1974); NUCLEAR POWER ISSUES AND CHOICES, *supra* note 31, at 243-67; Ausness, *High-Level Radioactive Waste Management: The Nuclear Dilemma*, 1979 WIS. L. REV. 707, 713-15; Hansell, *The Regulation of Low-Level Nuclear Waste*, 15 TULSA L.J. 249, 249 (1979); Lash, *A Comment on Nuclear Waste Disposal*, 4 J. CONTEMP. L. 267, 268-69 (1978). There are few off-site low-level waste storage facilities in the country. The bulk of this waste is stored on the plant site. These sites are reaching capacity and when utilities seek permission to expand on-site storage, they are met with opposition by localities. *See* City of W. Chicago v. NRC, 701 F.2d 632 (7th Cir. 1983) (court denied city's challenge to NRC's procedure in allowing utility to increase on-site storage); Lower Alloways Creek Twp. v. Public Serv. Elec. & Gas Co., 687 F.2d 732 (3d Cir. 1982) (court upheld NRC procedure in approving expansion of on-site storage of spent fuel); Potomac Alliance v. NRC, 682 F.2d 1030 (D.C. Cir. 1982) (court refused to sustain NRC order amending operating license to authorize utility's expansion of storage capacity). Finally, and most curiously, the federal government had no mechanism for resolving the waste disposal problem until 1982 when the Nuclear Waste Policy Act was passed. Pub. L. No. 97-425, 96 Stat. 2201 (codified at 42 U.S.C. §§ 10101-10226 (1982)). By the terms of the Act, five sites suitable for selection of the first repository site were to be nominated by the Secretary of the Interior. 42 U.S.C. § 10132(b)(1)(A). Subsequently, the Secretary was to recommend to the President three of the nominated sites as candidate sites, no later than January 1, 1985. 42 U.S.C. § 10132(b)(1)(B). By July 1, 1989, an additional five sites, including three not nominated previously must be nominated by the Secretary, and three of the candidate sites must be recommended to the President for the second repository. 42 U.S.C. § 10132(b)(1)(C). The President is responsible for the approval of candidate sites for repositories. 42 U.S.C. § 10132(C).

115. CAL. PUB. RES. CODE § 25524.2 (West 1977 & Supp. 1981).

116. Pacific Gas & Elec. Co. v. State Energy Resources Conservation & Dev. Comm'n, 472 F. Supp. 191 (S.D. Cal. 1979), 489 F. Supp. 699 (E.D. Cal. 1980), *rev'd in part*, 659 F.2d 903 (9th Cir. 1981).

117. 42 U.S.C. §§ 2011-2296 (1982).

118. The Atomic Energy Act of 1954, § 274(k) (codified at 42 U.S.C. § 2021(k) (1982)).

119. 659 F.2d at 925.

of the California statute based on the Court's characterization of California's nuclear moratorium as a financial rather than a safety measure.[120] The Court distinguished between radiological safety hazards, which fall in the province of the federal government, and non-radiological matters such as financial concerns, which are to be controlled by the states.[121]

A moment's reflection reveals that the distinction is largely spurious. Safety and economics are not separate, discrete issues. Waste disposal may present a radiological hazard, which raises health, environmental, and financial problems. The opinion is less a departure from the letter of the law than it is a departure from a well-entrenched policy[122] favoring a strong, centralized, federal regulatory regime. As a result of the Court's unwillingness to delve into the legislative history of the Warren-Alquist Act[123] and its willingness to accept the state legislation as a financial measure,[124] states may be able to halt the development of nuclear power.

The United States Supreme Court, in *Pacific Gas & Electric*, for the first time explicitly ruled that decisions regarding nuclear power are not within the exclusive province of the federal government.[125] Significant decisions regarding this most controversial of natural resources are also to be made by individual states. One commentator has written that such a result is "unsurprising"[126] due to the express language in the Atomic Energy Act of 1954 which reserved state decisionmaking power "for purposes other than protection against radiation hazards."[127] Most commentators and courts, however, conceded virtually complete decisionmaking power to the federal government and agreed that the field had been preempted.[128] Indeed, the Court easily could have justified an

120. 461 U.S. at 213-16.

121. *Id.* at 218-19.

122. Maleson, *The Historical Roots of the Legal System's Response to Nuclear Power*, 55 So. CAL. L. REV. 597, 610 (1982).

123. *See* 461 U.S. at 215-16.

124. *Id.* at 216.

125. *Id.* at 222-23.

126. Note, *The Supreme Court, 1982 Term*, 97 HARV. L. REV. 70, 242 (1983).

127. § 274(k) (codified at 42 U.S.C. § 2021(k) (1982)).

128. *See, e.g.*, Murphy & La Pierre, *Nuclear "Moratorium" Legislation in the States and The Supremacy Clause: A Case of Express Preemption*, 76 COLUM. L. REV. 392, 455 (1976); Note, *Energy Policy: A Test for Federalism*, 18 ARIZ. L. REV. 405, 416-17 (1976); Note, *Preemption Under the Atomic Energy Act of 1954: Permissible State Regulation of Nuclear Facilities, Location, Transportation of Radioactive Materials and Radioactive Waste Disposal*, 11 TULSA L.J. 397, 401 (1976); Note, *Nuclear Waste Management: What the States Can Do*, 1 VA. J. NATURAL RESOURCES 103, 150 (1980); Note, *Application of the Preemption Doctrine to State Laws Affecting Nuclear Power Plants*, 62 VA. L. REV. 738, 785 (1976). *Compare* Note, *Nuclear Power Regulation: Defining the Scope of State Authority*, 18 ARIZ. L. REV. 987 (1976). *See also* Commonwealth Edison Co. v. Pollution Control Bd., 5 Ill. App. 3d 800, 284 N.E.2d 342 (1972) (state statute regulating radioactive discharge standards held unconstitutional); New Jersey Dep't of Envtl. Protection v. Jersey Cent. Power & Light Co., 69 N.J. 102, 351 A.2d 337 (1976) (state regulations in conflict with AEC regulations are preempted). Professor Laurence H. Tribe authored an influential law review article, *California Declines The Nuclear Gamble: Is Such a State Choice Preempted?*, 7

opinion holding the California statute preempted either by stating that safety and financial matters are inextricably intertwined, or by noting that federal regulations in the nuclear field are pervasive and that the amendments to the Warren-Alquist Act frustrated federal controls. The case signified an important departure from previous regulation and announced a period of shared decisionmaking between federal and state governments, a period of cooperative federalism.

In one sense, the Supreme Court's holding in *Pacific Gas & Electric* merely added a gloss on the previous structure of decisionmaking. State public utility commissions and public service commissions already have primary responsibility for the continued financial viability of nuclear energy; they are the principle decisionmaking bodies regarding rate levels that utilities can charge for nuclear generated electricity. Simply stated, if rate levels are not high enough, utilities have a disincentive to invest in nuclear plants.[129] The Court's sanction of further state regulation may clear the way for state legislation on other matters, free from the limitation of preemption, and may introduce an important political element in nuclear policy formation.

Pacific Gas & Electric exemplifies the second characteristic of the transitional period for nuclear power regulation; what was once almost exclusive control of the industry by the federal government is now shared by the states. The bow to cooperative federalism, and therefore to decentralization, was repeated in *Silkwood v. Kerr-McGee Corp.*,[130] where the Court held that a state court's punitive damage award for radiation exposure was not preempted by federal law.[131] *Silkwood* was decided by a five-to-four majority. Justice Powell, joined by Justices Burger and Blackmun, dissented noting that lay juries and judges now can make regulatory judgments as to whether a federally licensed nuclear facility is being operated safely.[132] *Silkwood* was complemented by another decision, *Van Dissel v. Jersey Central Power and Light Co.*,[133]

ECOLOGY L.Q. 679, 686 (1979), which argued that California's moratorium legislation was based on economic, environmental and social reasons which were not preempted. He successfully argued this position in *Pacific Gas & Elec. Co.*, 461 U.S. 190 (1983). *See also* Marshall v. Consumers Power Co., 65 Mich. App. 237, 237 N.W.2d 266 (1975) (citizens may bring common-law nuisance action if subsequent measures to abate nuisance do not impede construction of nuclear plant).

129. *See* P. NAVARRO, THE DIMMING OF AMERICA: THE REAL COSTS OF ELECTRICAL UTILITY REGULATORY FAILURE 10 (1985).

130. Silkwood v. Kerr-McGee, 464 U.S. 238 (1984).

131. *Id.* at 258.

132. *Id.* at 283-86 (Powell, J., dissenting).

133. 181 N.J. Super. 516, 438 A.2d 563 (App. Div. 1981), *vacated & remanded*, 465 U.S. 1001, *dismissal aff'd*, 194 N.J. Super. 108, 476 A.2d 310 (App. Div. 1984). In *Van Dissel*, plaintiffs complained that the heat generated from a nuclear power plant warmed surrounding ocean water and caused worms to breed, damaging their docks. Suit was brought in state court and dismissed because of the preemption doctrine. The Supreme Court granted certiorari, vacated the denial, and remanded for state court consideration in light of *Silkwood*. On remand plaintiffs were unable to establish a causal link between thermal pollution and damage to their docks, and the dismissal was affirmed.

which upheld the power of state courts to award compensatory damages.

The states have accumulated a significant amount of nuclear decision-making power. *Pacific Gas & Electric* cleared the way for state legislatures to regulate directly "other" non-radiological matters. *Silkwood* and *Van Dissel* affirmed the power of state courts to regulate, at least indirectly, radiological matters. Thus, the face of nuclear regulation and the shape of the nuclear industry have been altered greatly by the Supreme Court without overturning either legislation or precedent. The Court's decisions embody the contemporary perception of nuclear power. One commentator has suggested that *Pacific Gas & Electric* and *Silkwood* may force industry and government to rethink the role of nuclear power in society, to reevaluate the nature of their collaborative relationship, and to reorient the regulatory climate.[134] Such a reevaluation is made more likely by the financial fallout of TMI.

The modern or, in keeping with contemporary scholarship, postmodern era of nuclear power regulation is characterized by two phenomena. First, the focus of both the private and public sectors is on the financial aspects of the industry rather than on the complex and controversial safety aspects. Second, governmental decisionmaking power is decentralized by *de jure* as well as *de facto* recognition of the states' role in nuclear energy law and policy since, as a matter of institutional structure and intentional design, the states are sharing decisionmaking authority with the federal government. These two phenomena result in a changing regulatory attitude toward the industry.

The focus on financial concerns of the industry is reinforced by decentralization since participation by the states in nuclear regulation is principally financial. At the same time, decentralization results in more politically sensitive regulation. Nuclear power regulation is therefore shaped by politics and markets and these influences can conflict. Economics is generally guided by efficiency criteria. Power is generally allocated by politics, motivated by concepts of equity and fairness. The regulatory state mixes both sets of variables. During the transitional period, policy dislocation occurs because of an incongruity between the needs and desires of market and political actors. Now, the once-unified

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134. Chiapetta, *United States Energy Policy After* Pacific Gas *and* Silkwood, 1985 ARIZ. ST. L.J. 79, 109. There is a clear division between federal and state regulation of nuclear power. The federal actors, particularly the NRC, continue to favor the industry. *See* REGULATORY REFORM TASK FORCE, *supra* note 63. *See also* Baltimore Gas & Elec. Co. v. Natural Resources Defense Council, Inc., 462 U.S. 87 (1983) (Court deferred to NRC regarding assessment of waste storage); Metropolitan Edison Co. v. People Against Nuclear Energy, 460 U.S. 766 (1983) (Court deferred to NRC's refusal to consider psychological harms of TMI-1 restart).

State courts, agencies, and legislatures are less sympathetic. Many public utilities commissions (PUCs) and courts refuse to pass along all costs. *See supra* note 89. Further, state legislatures have prevented automatic pass-throughs with anti-CWIP (construction-work-in-progress) legislation. *See, e.g.*, MO. REV. STAT. § 393.135 (Supp. 1986); N.H. REV. STAT. ANN. § 378:30-a (1984); *see also* Olson, *supra* note 99.

promotional nuclear policy has been repealed because of political and market forces. That promotional policy has been institutionalized, however, by law. Now the legal system must be retooled to accommodate the conflicting interests which have appeared during transition.

There are two important nuclear policy futures available to us. The first, best characterized as accommodationist,[135] is simply a continuation of the policy of utility regulation which attempts to protect large, centralized, high-technology utilities from their own folly. This protectionist attitude is manifested by the willingness of state public utilities commissions (PUCs) to pass on much of the cost of energy to consumers. There is a second alternative future available. This is a more responsive scenario, which draws its vision and values from the experience of the second transition. The next section of this Article will illuminate the values and norms that have arisen during this transition, as a prelude to constructing an alternative policy future.

III. RESPONSIBILITY AND LIABILITY

The most visible consequence of the mistaken policy choice[136] to

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135. PUCs have allocated abandonment costs in one of three ways. States may impose the burden on utility shareholders by refusing to allow cancellation costs to be included in the rate base. *See, e.g.*, Citizens Action Coalition v. Northern Indiana Pub. Serv. Co., 472 N.E.2d 938 (Ind. App. 1984); Appeal of Pub. Serv. Co., 125 N.H. 46, 480 A.2d 20 (1984); Office of Consumers' Counsel v. Public Util. Comm'n, 67 Ohio St. 2d 153, 423 N.W.2d 820 (1981); Pacific Power & Light Co. v. Public Serv. Comm'n, 677 P.2d 799 (Wyo. 1984), *cert. denied*, 105 S. Ct. 180 (1984); *In re* Arizona Pub. Serv. Co., 38 PUB. UTIL. REP. 4th (PUR) 547 (Ariz. Corp. Comm'n, May 29, 1981); *In re* Pacific Power & Light Co., 53 PUB. UTIL. REP. 4th (PUR) 24 (Mont. Pub. Serv. Comm'n, Apr. 18, 1983). However, some of these states, such as Ohio, allow higher rates of return precisely to protect shareholders.

Other states pass costs on to ratepayers under the theory that the utility was fulfilling its service obligation. *See, e.g.*, Missouri *ex rel.* Union Elec. Co. v. Missouri Pub. Serv. Comm'n, 687 S.W.2d 162 (Mo. 1985); *In re* United Illuminating Co., 55 PUB. UTIL. REP. 4th (PUR) 252 (Conn. Dep't Pub. Util. Control, Aug. 22, 1983); *In re* Rochester Gas & Elec. Corp., 45 PUB. UTIL. REP. 4th (PUR) 386 (N.Y. Pub. Serv. Comm'n, Jan. 13, 1982); *In re* Carolina Power & Light Co., 55 PUB. UTIL. REP. 4th (PUR) 582 (N.C. Util. Comm'n, Sept. 19, 1983).

The majority of states allow the burden to be shared by the utility's investors and ratepayers. This is frequently done by identifying the cost to be passed on to ratepayers, and then amortizing the amount over a term of years. *See, e.g.*, Central Maine Power Co. v. Maine Pub. Util. Comm'n, 433 A.2d 331 (Me. 1981); Att'y Gen. v. Department of Pub. Util., 390 Mass. 208, 455 N.E.2d 414 (1983); *In re* Jersey Cent. Power & Light Co., 85 N.J. 520, 428 A.2d 498 (1981); *In re* Union Elec. Co., 53 PUB. UTIL. REP. 4th (PUR) 565 (Ill. Commerce Comm'n, May 25, 1983); *In re* Boston Edison Co., 46 PUB. UTIL. REP. 4th (PUR) 431 (Mass. Dep't Pub. Util., Apr. 30, 1982); *In re* Virginia Elec. Power Co., 44 PUB. UTIL. REP. 4th (PUR) 46 (Va. State Corp. Comm'n, Aug. 24, 1981); Washington Util. & Transp. Comm'n v. Puget Sound Power & Light Co., 54 PUB. UTIL. REP. 4th (PUR) 480 (Wash. Util. & Transp. Comm'n, July 22, 1983); *In re* Virginia Elec. & Power Co., 54 PUB. UTIL. REP. 4th (PUR) 1 (W. Va. Pub. Serv. Comm'n, June 13, 1983).

136. While the joint government-industry nuclear venture may well have been the proper and intelligent choice in the late 1940's and early 1950's, the promotional nuclear policy has now proven to be a financial mistake. Professor Richard Pierce calls this situation a "mistake in retrospect." *See* Pierce, *supra* note 42, at 498. Further, this author's use of the term "mistake" refers ambiguously either to the choice of ends (i.e., nuclear power) or to the choice of means (i.e., government support). The intentional ambiguity does not undercut the principal point that development of nuclear power has imposed enormous costs on society which may have been avoided either by choosing different ends

develop nuclear power is the cost. Again, the primary problem is: Who pays? In a perfect world, those responsible for creating costs without producing resultant benefits should pay. In an imperfect world, correlating costs which produce no benefit with the parties responsible is not often easy, particularly when the government actively promotes the capital expansion of a complex high-technology industry. By promoting commercial nuclear power, however, the government is not necessarily implicated in a reactor vendor's design defects or a utility's management failures.[137] Frequently, there is no exact correlation between conduct, cause, and consequence. In a capitalist democracy, *laissez-faire* principles govern as long as the market functions relatively smoothly; government regulates only when the market fails. Determining market failure, however, is a political judgment, not a precise econometric calculation. Thus, the imperfect correlation between cause and effect, and between responsibility and liability, results when a government program is affected by divergent political and market signals.

In the case of nuclear regulation, the market has collapsed because projects are now too costly. At the same time, the political response has been to decentralize decisionmaking, thus raising costs. This conflict needs to be reconciled, or the policy choice and government lose their claims to legitimacy.[138] The reconciliation of market needs and political desires in the area of nuclear energy must be based on a coherent theory of liability which spreads costs and risks fairly and efficiently to active participants instead of to passive victims. The liability theory must consciously recognize the long-term political and policy implications of a particular cost-spreading strategy, as well as the obvious and immediate economic interests involved.

Equity and efficiency, each the *sine qua non* of politics and markets, are not always coterminous. Critics of modern bureaucracy claim that policymakers, in their search for efficiency, lose sight of fairness.[139] The tendency to trade off equity in favor of efficiency is more pronounced when a bureaucracy is charged with "economic" rather than "social" regulation.[140] This distinction between economic and social regulation has the negative effect of subverting social and political equitable values.

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or means.

137. *See* Cincinnati Gas & Elec. Co. v. General Elec., No. C-1-84-0988 (S.D. Ohio, filed July 10, 1984); O'Brien-Kreitzberg & Assoc., Inc., Wm. H. Zimmer Nuclear Power Station: Analysis of Possible Mismanagement and Correlated Cost, Executive Summary (June 15, 1984) (report on file with author).

138. *See generally* J. HABERMAS, LEGITIMATION CRISIS (Beacon ed. 1975); J.A. CAMILLERI, THE STATE AND NUCLEAR POWER: CONFLICT AND CONTROL IN THE WESTERN WORLD (1984).

139. Frug, *supra* note 9, at 1286.

140. *See* J. FISHKIN, TYRANNY AND LEGITIMACY: A CRITIQUE OF POLITICAL THEORIES 91-96 (1979); L. LAVE, THE STRATEGY OF SOCIAL REGULATION: DECISION FRAMEWORKS FOR POLICY 130-31 (1981); Tomain, *Institutionalized Conflicts Between Law and Policy*, 16 HOUSTON L. REV. 661, 715-22 (1985).

Nuclear regulation should not concentrate on finances at the expense of more normative matters, nor adopt a distinction which favors economy over equity. First, the history of nuclear regulation shows that it is motivated by political as well as by economic values. Second, the industry-government configuration should provide some measure of democratic participation; government should respond to the common will and not just to government-industry interests. Third, the nature of a high-technology industry, coupled with high-risk, low-probability dangers, demands that decisionmaking incorporate equitable and political values into the cost-risk allocation theory.[141]

The debate over who should be liable begins by identifying the actors in the nuclear drama. These include the government and its officials, industry and its personnel, and consumers and investors. The most likely targets for cost spreading are ratepayers, the utilities' consumers. At present, utility ratepayers are most often targeted to absorb most costs associated with nuclear plant cancellations through rate increases.[142] However, ratepayers are an odd target, because they have the least voice in the nuclear decisionmaking process and may receive no energy in exchange for their payments. This oddity stems from the policy, institutionalized in nuclear regulation, to build first and assess safety and financial risks later.[143] Support for this promotional policy has since eroded; the country is now overinvested in nuclear plants whose safety is questionable and whose capacity may be unnecessary. The rationalization for imposing these costs on ratepayers stems from the belief that nuclear power is an essential commodity and should be paid for by those who derive the greatest benefit from it.

The second most likely group to absorb costs are taxpayers. When a utility takes a tax write-off, national revenue decreases. Less often, the whole burden of abandonment expenses has been shouldered by a utility company's shareholders.[144] Little liability, however, has been imposed upon governmental and private groups who directly participated in the initial planning, attempted implementation, and eventual demise of nuclear power projects. This section examines the roles of the participants in the disaster of abandonment costs and the theories of legal liability for imposing these costs.

The traditional model of utility regulation depicts an unstable hierarchy of responsibility and liability, described below in Figure 1. At the top of the hierarchy, primary responsibility can be attributed to "govern-

141. *See supra* note 93 and accompanying text; *see also infra* notes 235-36 and accompanying text.

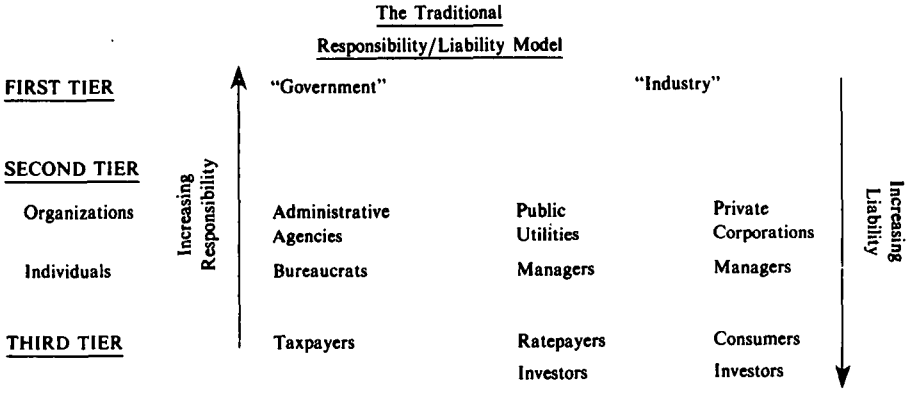
142. Pierce, *supra* note 42, at 518-19; Howe, *A Survey of Regulatory Treatment of Plant Cancellation Costs*, 111 PUB. UTIL. FORT., Mar. 31, 1983, at 52.

143. *See* Averich & Johnson, *supra* note 37.

144. The normal cost allocation "balances" costs between ratepayers and shareholders. Rarely does the full burden fall on shareholders. *See infra* text accompanying notes 220-24.

ment" and "industry" for so heavily promoting the joint venture. The second tier of the hierarchy consists of organizations and individuals involved more directly with carrying out promotional policy decisions. This level includes: private firms, such as reactor vendors, architects, engineers, and construction contractors; public utilities; and government officials and industry personnel. The lowest level consists of ratepayers and consumers, shareholders and bondholders, and taxpayers. These last groups have little voice in choosing nuclear power though they bear most of the financial burden. The hierarchy is unstable and inefficient because liability is apportioned inversely to responsibility; those most responsible, "government" and "industry," are least liable, while those least responsible, ratepayers, taxpayers, investors, and consumers face the greatest exposure to financial risk.

FIGURE 1



A. *First Tier*

1. "Government"

The regulation of the nuclear power industry is not a simple matter. The industry is complex, the subject matter is often technologically and scientifically uncertain, and the financial investment committed to the development of the industry is expended over a decade before any electric service is realized.[145] In addition to the complexities inherent in the industry, there is an intricate overlay of government regulators. Govern-

145. Construction lead times in the nuclear industry can approach 15 years. *See* OTA REPORT, *supra* note 42, at 4.

ment, particularly the federal government, is the centripetal force which holds the nuclear power industry together. Without government support, there would be no nuclear industry.[146] Hence, government should stand ready to take responsibility for its protective and promotional role. Whether it does or not remains an open and problematic question because the term "government" is a generalized abstraction behind which no independent, concrete entity stands. Nevertheless, a discussion of the abstraction uncovers certain characteristics of the relationship of law and modern government.

In connection with cost absorption or legal liability, "government" is actually a euphemism for taxpayers. Only in the rarest situations, such as when a government official acts outside the scope of his or her authority, usually with malice or other equally gross conduct, will an individual be held financially liable.[147] Depletion of the government fisc, through imposition of liability, inevitably results in higher taxes. Therefore, in the present context, the word "taxpayers" may be substituted for "government."

There are two important and conflicting justifications for imposing liability on government. The first is the efficiency argument. Cost spreading to national taxpayers means that abandonment costs are spread as thinly as possible. This disbursement may seem desirable as well as fair. The second justification for imposing liability on government is the responsibility argument. The rationale behind cost allocation to taxpayers lies in the government's perception that the promotion of the nuclear power industry is in the nation's interest. Costs are spread to taxpayers because the government accepts financial liability for its mistakes. The government, as the representative of the public weal, is actively engaged in the development of an industry that once held great promise for our future. Nuclear technology was to be tamed by the transition from a destructive force to a clean, inexpensive, safe, and peaceful source of electricity. Concurrently with this commercialization, the United States was to be in the forefront of developing and controlling a technology capable of world destruction, thus maintaining superiority in the nuclear standoff. In this scenario, the nation's economy, energy supply, and national security would be guaranteed and strengthened. Once this bright future failed to materialize, that powerful ally in Washington, government, felt compelled to rescue the needy nuclear industry. Costs are to be absorbed less painfully, in small segments, by the country's taxpayers who feel little financial loss and can be somewhat mollified knowing that they were participants in an unfortunately unsuccessful experiment in public policy.

Government intervention is the primary element of the activist state.

146. *See supra* text accompanying notes 24-29.
147. *See* P. SCHUCK, SUING GOVERNMENT (1983).

Federal assistance is an acceptable response to financial crises, particularly if the ailing industry is large enough. Given the nature of regulated industries, government support is clearly warranted from the industry's standpoint. The government was instrumental in encouraging private sector participation, but its regulatory controls did not remain constant and, not infrequently, plant owners had to dump additional finances into a nuclear project to comply with the government's changing commands.[148] Additionally, the legal regime's institutionalization of government's nuclear policy reinforced the private sector's commitment of capital to nuclear projects. Rate regulation was an incentive to invest in large, capital intensive projects; a utility would not earn a return on investment until the plant was operational.[149] The private sector, plant managers and operators, and shareholders and bondholders, had no real choice but to capitulate to the regulatory state's increasing demand for capital contribution. Following this line of reasoning, it is not only reasonable but fair that government should stand ready to support investment decisions it directed. This scheme of government aid can be seen as an exercise of government responsibility, or rather not so charitably described as a bailout.

The efficiency and responsibility arguments are rhetorical; they both undercut and reinforce each other. By accepting responsibility for losses incurred in the construction and subsequent abandonment of nuclear plants, and by recouping those losses through taxes, the government spreads costs widely and, arguably, efficiently. Nevertheless, this scheme of taxation subsidizes the nuclear industry. That industry, then, is inefficiently spared market risks and losses otherwise attributable to bad investment decisions. Likewise, if the efficiency argument is accepted, it supports and undercuts the responsibility argument. Government accepts fiscal responsibility for its policies, but the subsidization of industry legitimizes and encourages irresponsible decisions to overinvest. These two justifications can support and undermine each other simultaneously because they are exercises in policy rhetoric which tell only half of the abandonment-costs story.

In no small sense is rhetoric a part of nuclear policymaking. Rather, rhetoric is often determinative in policy analysis. Cost allocation alternatives are best viewed as choices between different political and economic

148. The NRC changed many regulations after TMI. *See supra* notes 60-63 and accompanying text. Although regulation adds costs to projects, most commentators, including industry advocates, do not attribute regulatory costs as a key factor in the industry's demise. *See* C. FLAVIN, *supra* note 36; Cook, *supra* note 38.

149. This statement about rate regulation is overinclusive. Most states apply the "used and useful" standard which means that a utility does not earn a return on its invested capital *until* the plant is on line. Many states, and the Federal Energy Regulatory Commission, allow a utility to collect some of the capital invested during construction. *See generally* C. PHILLIPS, THE REGULATION OF PUBLIC UTILITIES 322-27 (1984). *See also* Howe, *supra* note 142.

worldviews. Thus, a dialogue between politics and economics shapes policy choice. In one sense, the market argument for efficiency and the political argument for responsibility conflict because they can be interpreted to undercut each other. Yet, in another sense, they are complementary because they are both caricatures of the same economically based story. Responsibility-based bailout is a picture of government enticing and dominating a benign industry. The corresponding image of costs, thinly and efficiently allocated to taxpayers, is a portrayal of an unsuccessful, but heroic, public project. Both stories, however, have the same unfortunate ending with taxpayers saving the industry.

The dialogue between economics and politics, which yields a policy choice of cost allocation to taxpayers, is too narrow. The essential weakness in the current dialogue about nuclear policy is that it has been dominated by economic arguments at the expense of political interests. Specifically, nuclear policy has not kept up with changes in a political climate grown skeptical of nuclear power. The failure or inability of bureaucracy to respond effectively is the essential weakness in the law-follows-policy formula. Institutionalized policy, supported by law, acts as a drag on reform efforts necessitated by political and/or market changes, causing the system to experience regulatory failure. This regulatory sluggishness is a cost of the activist state. In the case of nuclear power, the political dimension of the nuclear debate, which honors democratic participation, is ignored in an effort to resolve the financial predicament. The collective voice of consumers and taxpayers, which is often too weak to affect policy, is conspicuously absent from the responsibility and efficiency scenarios.

A major obstacle to effective and constant public participation is the problem of collective action.[150] Individual citizens are not easily compelled to organize and form coalitions to take on actors the size of the government and the nuclear industry. Public interest organizations are too poorly financed, too disorganized, and have too many divergent interests to compete against larger, more centralized, interest groups.[151] Another obstacle is the half-false belief that government bureaucracy and the technological establishment are objective.[152] Faith in the idea of

150. *See generally* J. BUCHANAN & G. TULLOCK, THE CALCULUS OF CONSENT: LOGICAL FOUNDATIONS OF CONSTITUTIONAL DEMOCRACY (1965); M. OLSON, THE LOGIC OF COLLECTIVE ACTION (1965).

151. *See* J. CHUBB, *supra* note 18, at 110-13. Professor Chubb argues that energy policy is shaped by government and industry interests and that public interest as such is an ineffective competitor. *Id.* at 89-125. Over the last decade, many states have created specific agencies to represent consumers in rate hearings. The Office of Consumers' Counsel in Ohio, for example, has been "successful" in forestalling the impact of cancelled nuclear plants on consumers. *See* Consumers' Counsel v. Public Utils. Comm'n, 67 Ohio St. 2d 153 (1981).

152. *See, e.g.*, Tushnet, *The Constitution of the Bureaucratic State*, 86 W. VA. L. REV. 1077, 1078-80 (1984); Frug, *supra* note 9, at 1296-1317 (1984). Professor Frug describes, in great detail, four bureaucratic models including the formalist model. *See also* Stewart, *The Reformation of*

scientific progress, when technology makes advances and that progress is objectively verifiable by experts, is comforting. In an effort to solve complex problems, the modern state facilitates the development of science and technology through its offices. The promise of the bureaucratic state is that Congress will delegate policymaking authority over selected issues to specialists. That bureaucracy then develops the expertise necessary to fashion correct solutions. What is true about this description of an objective and scientific bureaucratic state is that it is the premise on which agencies are created. We, as individuals and as a society, desire it to be true. Our desire is grounded in the hope that complex problems can be mastered by experts. Unfortunately, the vision of unassailable bureaucratic expertise is false. The collective agencies of the government have not devised solutions to what now appear to be intractable problems of nuclear power, such as emergency evacuation, decommissioning, and waste disposal. Misplaced public faith in this expertise has partially disenfranchised the citizenry and precluded their effective participation in the political process.

Imposing costs on government *qua* taxpayers is a politically loaded policy choice. This choice may appear financially attractive but the attraction is short-term and does not readily correspond with the realities of the industry-government relationship. It is a choice that imposes *no* costs on government per se and avoids cost imposition on industry. Likewise, it encourages industry and government to dump capital into failing projects over a period of years and then provides a quick financial fix to buoy a sagging industry. Thus, even if attributing costs to government is an attractive alternative, it is not an automatic choice despite the government's pervasive involvement in the nuclear industry.

2. "Industry"

The fundamental fallacy in the arguments favoring imposition of cost liability on government is that "government," as such, does not exist, since "government" ultimately consists of taxpayers. Similarly, "industry," as such, does not exist. Rather, industry is a collective concept including various public utilities and private construction and manufacturing corporations. Just as government passes its liability on to taxpayers, industry passes its liability to owners and lenders, that is the firms' shareholders and bondholders, or to consumers of the firms' goods or services.

While the same efficiency and responsibility arguments are applicable

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American Administrative Law, 88 HARV. L. REV. 1667, 1671-88 (1975). Frug makes a telling point when he compares administrative law with corporate law and argues that they share common failures. Frug, *supra* note 9, at 1296-1317 *passim*. The nuclear industry and its regulation also have the weaknesses Frug describes, in large part because of the closeness of government and industry in the joint venture.

to industry, the arguments contain the same weak or semi-true rationales. Industry is no less responsible for the nuclear venture than government, and hence "industry" should pay for its mistakes. However, the industry personnel most responsible for participation in nuclear decisions are directors who, like bureaucrats, are not liable for abandonment costs. Instead, costs are passed on to investors and consumers who have little real participation in firm policy. Furthermore, the financial support provided by government promotes, rather than deters, irresponsible conduct by industry.

The efficiency argument as applied to industry is more complicated. In an efficient market, costs are distributed to the private sector actors who are in the best position, or who are most willing, to absorb them. A firm will absorb costs as long as they are below marginal revenues. However, the nuclear market is highly artificial. Industry, in the activist state, is insulated from market risks by government support. The example of turnkey contracts[153] demonstrates this principle. Reactor vendors took large short-term losses to create a long-term market. The gamble failed when the long-term market failed. Presumably, the utilities should have paid cost overruns, but these were passed through to consumers by a ratemaking system which encourages overinvestment.[154] Similarly, the Price-Anderson Act encouraged private sector participation by providing a financial safety net. The Act, which enjoyed broad political support in 1957,[155] successfully brought private funds to the nuclear market. Political support for nuclear power has since disintegrated, and the Act may be amended when it comes up for renewal to impose greater financial liability on firms.[156] While it can be argued that it is both fair and efficient to impose increased liability on industry, because that is how markets ought to work, such a position ignores the government's role in creating an enticing investment market. The efficiency argument also fails to recognize that abandonment costs will be passed through to ratepayers rather than absorbed by industry actors.

The weakness in the policy choice of imposing costs on government is that taxpayers are forced to absorb the costs of abandoned nuclear facilities for which they had little or no responsibility and from which they have derived no benefit. The same weakness appears in the policy choice imposing costs on industry. These costs will ultimately be placed on

153. *See supra* notes 34-36 and accompanying text.

154. State PUCs do not automatically pass all costs on to ratepayers. In some states, if the plant is not operational it is not included in the rate base. In other states, if the decision to invest or to continue to invest in a nuclear plant was imprudent, then that plant is not included in the rate base. Nevertheless, even when PUCs exclude costs from the rate base, they often allow a higher rate of return on other investments in order to attract necessary capital. That higher rate of return is paid by consumers. *See* Urban, *Allocating the Costs of Failed or Abandoned Projects or Regulated Public Utilities*, PUB. UTIL. FORT., May 24, 1984, at 33.

155. G. MAZUZAN & J. WALKER, *supra* note 18, at 201-13.

156. *See* Nuclear Incident Liability Reform Act of 1981, H.R. 421, 98th Cong., 1st Sess. (1983).

shareholders and bondholders, or ratepayers and consumers, who enjoy little participation in policymaking. Deterrence of future losses will not be effected if liability is imposed on non-participants. Hope of correcting this imbalance lies less in an outcome determinative policy choice, for example a choice between placing costs on ratepayers or shareholders, than it does on restructuring the decisionmaking system so that responsibility and liability are more closely aligned, and more accurately reflect market and political interests. It is unfair to impose costs on consumers, investors, and taxpayers disproportionate to their voice in policymaking, as the traditional model requires. Regulatory reform speaks more to formation of future nuclear policy than to allocating past losses. However, each decision influences the other and should coincide.

B. *Second Tier*

The second tier has three characteristics. First, because it includes identifiable entities, the tier is not a generalized abstraction. Instead, specific organizations or individuals can be identified as the responsible actors whose conduct leads to recognizable consequences.

Second, second-tier actors are granted substantial immunity from liability because they are carrying out orders of a larger entity. Individuals, such as government officials, are fulfilling the mandate of an agency created by Congress, and industry officials are carrying out corporate policy commands. Other organizations rely on a similar claim. Private firms and public agencies both argue that they are pursuing public policy directives.[157] Second-tier actors, the argument continues, are agents furthering the work of their principals and are not acting on their own. Private individuals, most likely, will not pay personally for costs attributable to them. Similarly, organizational immunity effectively exists because liability is passed through to the third tier.

Third, this grant of immunity is premised largely on several myths, that Congress carries out the will of the people, corporations carry out the will of their owners, and consumers have effective votes both in the marketplace and at the polls. Government and industry, however, do not incorporate perfectly the will of the electorate or the will of consumers and investors in their daily activities. Government officials and industry personnel, in their allegiance to organizational interests, exercise initiative and discretion independent of the desires of citizens and owners, since both bureaucrats and directors must strive to retain their position in the organization.[158]

Organizational independence requires a realignment of responsibility

157. Frug, *supra* note 9, at 1318-34.

158. *See, e.g.*, Note, *Greenmail: Targeted Stock Repurchases and the Management-Entrenchment Hypothesis*, 98 HARV. L. REV. 1045, 1047-48 (1985).

and liability. The myth of organizational representation is the basis for the immunization of government officials and industry personnel from acting on behalf of others.[159] It is also the basis for the partial justifications of efficiency and responsibility already discussed. The undesirable consequence of the myth is the institutionalization of a policy choice allocating costs inefficiently and unfairly down the line.

1. Federal Government

The Nuclear Regulatory Commission (NRC), a second-tier actor, is the primary federal agency involved in the licensing and development of nuclear power facilities. By authority of the Atomic Energy Act, the NRC is given responsibility to conduct inspections and investigations and to issue orders protecting public health and minimizing dangers to life and property.[160] The NRC also has expansive powers over licensing, construction, and operation of nuclear power facilities for the protection of the health and safety of both plant employees and the general public.[161]

The NRC has adopted explicit guidelines and standards for inspection and oversight of the construction process.[162] The agency's Office of Inspection and Enforcement develops the inspection policies and programs, carries out inspections and investigations to ascertain compliance, and enforces its findings through a variety of sanctions and penalties.[163]

The Office of Inspection and Enforcement has responsibility for the construction of reactors and of nuclear power generation facilities.[164] The regulations contain detailed technical provisions concerning plant construction, including provisions for an on-site Resident Inspector and staff,[165] vendor inspection, quality assurance,[166] and design control programs.[167] In practice, NRC personnel have been less vigilant than required under the regulations.[168] The numerous accusations, investigations, and occasional admissions of misconduct during plant construction evince the failure of NRC oversight.[169] Given the imprecision of NRC safety inspections, it is not uncommon for an inspection team either to miss violations and find them on a subsequent inspection, or to note the

159. Frug, *supra* note 9, at 1295-96, and *passim*.
160. 10 C.F.R. Pt. 21 (1985).
161. *See, e.g.*, 10 C.F.R. Pts. 2, 30, 31 & 32 (1985).
162. 10 C.F.R. Pt. 50 (1985).
163. 10 C.F.R. § 1.64 (1985).
164. 10 C.F.R. § 50.70 (1985).
165. *Id.*
166. 10 C.F.R. Pt. 50, App. B, No. II (1985).
167. 10 C.F.R. Pt. 50, App. B, No. III (1985).
168. *See* SAFETY SECOND, *supra* note 63.
169. *See, e.g.*, Campo, *The Case Against Shoreham*, in REPORT OF THE NEW YORK STATE FACT FINDING PANEL ON THE SHOREHAM NUCLEAR POWER FACILITY 38-40 (Dec. 1983); Van Loon & Weiss, *supra* note 91, at 3.

violations without taking any enforcement action.[170] Case studies reveal that corrective action by utilities was not seriously considered until recently.[171] Corrections mean delays and delays mean higher costs. A plant can accept higher costs, pass them to ratepayers, or attempt to hold the government, manufacturers, or contractors liable.

To date, one case has been brought against the United States under the Federal Tort Claims Act[172] for negligent NRC inspections. In *General Public Utilities v. United States*,[173] TMI's owners, General Public Utilities (GPU), alleged that the NRC had a duty to warn of design hazards, and that damages from a "loss-of-coolant" accident amounted to over four billion dollars. GPU argued that prior to TMI a similar accident had occurred at the Davis-Besse plant in Ohio.[174] GPU complained that the NRC negligently failed to disseminate information regarding the cause of the Davis-Besse accident and subsequently developed corrective measures. Plaintiff further asserted that the NRC approved TMI's construction plans containing the same PORV valve at fault at Davis-Besse at a time when the agency should have known of the possibility of a "loss-of-coolant" accident.[175] The district court rejected the government's assertion that it owed no duty to GPU, and that its duty inured solely to the public:

> An evaluation of the relevant statutes, regulations and legislative history established, however, that the relationship between the NRC and the nuclear industry contained elements of symbiosis, which *may* form the predicate for imposing liability.[176]

The court avoided deciding whether the government's failure to warn, or the issuance of a license to a plant with a faulty valve, fell within the discretionary function exception, by certifying the issue for interlocutory

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170. Nuclear plants revealed a marked change in attitude toward safety, post-TMI, but that change may have been short-lived. *See* SAFETY SECOND, *supra* note 63, at 7. *See also* Diamond, *The Heat is Still Rising on Nuclear Regulators*, N.Y. Times, July 29, 1984, at D24, col. 4; Wald, *Panel Concedes Erring in Permit for Atom Plant*, N.Y. Times, July 24, 1984, at A10, col. 1; *see also* Government Accountability Project, Request for an Investigation Pursuant to 5 U.S.C. § 1206(b)(7) Before the Office of the Special Counsel of the Merit Systems Protection Board (Dec. 10, 1980) [hereinafter cited as Government Accountability Project]. GAP more generally charged the NRC with failure "to perform a thorough and complete investigation of serious allegations" made about the Zimmer facility. *Id.* at 1.

171. Government Accountability Project, *supra* note 170, at 1.

172. 28 U.S.C. §§ 2671-2680 (1982).

173. 551 F. Supp. 521 (E.D. Pa. 1982), *rev'd*, 745 F.2d 239 (3d Cir. 1984).

174. 551 F. Supp. at 523. This plant recently has had another TMI-like mishap. Wald, *A Near Miss in Ohio Harkens Back to Three Mile Island*, N.Y. Times, June 16, 1985, § 4, at 3, col. 1.

175. 551 F. Supp. at 523.

176. *Id.* at 525. The court later wrote:

> The NRC's duty to monitor the industry and warn of safety problems does not, however, amount to a *guarantee* of plant safety. . . . Accordingly, we conclude that . . . the NRC has undertaken *some* duty to carefully monitor nuclear experiences and to disseminate appropriate warnings. Moreover, this duty runs, *inter alia*, to the nuclear power industry.

Id. at 526.

appeal.[177]

The Third Circuit reversed and held that a FTCA suit was barred by the discretionary function exception.[178] The purpose of the discretionary function exception is to allow regulators to administer their programs without the threat of a court "second guessing" agency policymaking.[179] The court held that the NRC's investigation of the Davis-Besse event, its categorization of the incident as "an abnormal occurrence," and its form of notification were discretionary, stating:

> This is not a mere ministerial task. Technical and scientific evaluations of nuclear processes and facilities must be taken into account along with considerations of public health and safety—matters within the specialized knowledge of the Commission.[180]

2. State Government

State public utility commissions (PUCs)are the state agencies which deal most directly with nuclear abandonment costs. The primary functions reserved to PUCs are rate regulation and general supervision of non-safety matters. Only rarely do PUCs directly involve themselves with licensing or abandonment decisions.[181] Utility directors have the initial responsibility of deciding whether to build or abandon a plant. Once the managerial decision to initiate construction is made, the federal government completes necessary licensing at the front-end and then supervises construction and operation. After the plant is built and on-line, the state steps in to ensure that utility ratepayers are charged fair and reasonable rates for the energy that is consumed.[182] Thus, PUCs concentrate on the back-end of the nuclear construction cycle by deciding how much a utility can charge its customers. It is through the rate structure that a utility earns revenue for plant operation and maintenance, and additional projects.

Because of this bifurcated regulatory responsibility, the states' authority is somewhat attenuated. A state must follow the federal lead, as the management decision to construct a nuclear plant is given approval by federal licensing authorities. Nonetheless, the state's role cannot be minimized. During a rate hearing, PUCs have the power to determine what factors or items should be included in a utility's operating expenses

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177. *Id.* at 530-31. The court denied the government's motion to dismiss and certified an interlocutory appeal. The Third Circuit stayed the proceeding until the United States Supreme Court decided United States v. S.A. Empresa De Viacao Aerea Rio Grandense (Varig Airlines), 104 S. Ct. 2755 (absolving the government of liability), *reh'g denied*, 105 S. Ct. 26 (1984).

178. General Pub. Utils. Corp. v. United States, 745 F.2d 239 (3d Cir. 1984).

179. *See* United States v. Varig Airlines, 104 S. Ct. at 2764.

180. 745 F.2d at 246.

181. Pierce, *supra* note 42, at 508-11.

182. *See generally* C. PHILLIPS, *supra* note 149. *See also* J. BONBRIGHT, PRINCIPLES OF PUBLIC UTILITY RATES (1961) (for an examination of the attributes of "reasonable" utility rates).

and rate base, and what items are not recoverable. This discretion allows the commission to exclude costs of utility property not to be included as a basis for the utility's revenue requirements. More importantly, state commissions have the power to exclude from the rate base costs accrued due to imprudent management.[183] Management prudence regarding cancelled projects is a central issue of rate regulation.

PUCs have vast discretion to include certain costs in the utility rate base. This is due to the complex nature of ratemaking methodology which does not, and is not required to, conform to a fixed standard.[184] The state can be made liable for the intentional or reckless wrongdoing of state officials or agencies, much the same way that the federal government is liable for the acts of its employees.[185] The doctrine of sovereign immunity, however, applies to the states as well, permitting no state liability in tort unless consent is given.[186] Liability for the costs of plant abandonment has never been imposed on state public utility commissions due to federal preemption of construction and operating licenses, as well as the discretionary nature of PUC activities in ratemaking.

Another, more compelling rationale for insulating state agencies from immunity in the area of rates and ratemaking is that state public utility commissioners are engaged in a quasi-judicial function. The commissioners preside at hearings where different sides present evidence on competing policies. As state public officials, the commissioners may be accountable for wrongs committed in office. Those wrongs however must be outrageous or criminal before liability attaches.[187] Commissioners, for example, may not be involved in any business activity that would prevent them from being fair and impartial in carrying out their duties. The usual remedy for this type of misconduct is disqualification and not damages.

A federal statute is the primary vehicle for imposition of liability upon individual state employees for misconduct in carrying out their official duties.[188] Under this statute, a state employee must knowingly or recklessly deny constitutional rights. The statute cannot be used to correct errors of policy judgment. Since rate decisions require high levels of policy analysis regarding cost allocations, commissioners are largely protected from liability. Furthermore, the commission's duties are quasi-judicial and quasi-legislative, and are therefore protected to a greater degree than those of government officers executing operational duties. Provided the utility commissioners act in good faith in executing their

183. *See, e.g., Regulatory Response to Cancelled Energy Plants*, 13 HOFSTRA L. REV. 443 (1985).

184. *See* Federal Power Comm'n v. Hope Natural Gas Co., 320 U.S. 591 (1944) (allowing use of flexible ratemaking standards).

185. *See* P. SCHUCK, *supra* note 147.

186. *Id.*

187. *Id.*

188. 42 U.S.C. § 1983 (1982).

duties, the commissioners' official actions receive a high level of immunity, insulating them from personal liability.

Suing the government for abandonment costs may appear to be an attractive, and logical, alternative if we consider the magnitude of the role that government has played in promoting a pro-nuclear policy. We may even go further and charge that the government was irresponsible, given the magnitude of the policy mistake. Nevertheless, such assertions are simply not enough to hold government officials or agencies liable. Government, and its officials, are given leeway to make policy mistakes as long as these mistakes are not made in reckless disregard of constitutional rights. Before officials are held liable in their individual capacities, they must exceed the scope of their employment and step outside their protective mantle of immunity.

Even if government and its agencies were held liable, the victory would be a Pyrrhic one since taxpayers would ultimately pay. Spreading costs to taxpayers is the least painful method of cost allocation, but cost allocation may result in inefficiency because industry escapes liability and is provided with little incentive to lower costs. The next group facing financial exposure consists of second-tier industrial actors.

3. Firms

Litigation among members of the nuclear industrial community is a new and developing field of law. A nuclear power plant is designed by architects and engineers, built by construction contractors, and supplied by reactor vendors. These parties, together with utilities, are the firms which comprise the industry. If their work is faulty, the repair or replacement of the defects add to the bargained-for cost of the plant. Likewise, delays in construction due to supply interruptions or regulatory lag also increase costs. When electricity was cheap and nuclear investment was attractive, utilities could pass through design, construction, and equipment costs to ratepayers without worrying about the expenses.[189] However after a utility has borrowed all it can and has spent all the funds available, unless PUCs automatically grant rate increases, contributions may be sought from ratepayers, shareholders, or other industry actors. It is due to rising costs that, although the nuclear power industry has been actively building plants for nearly three decades, construction litigation was rare until recently.[190]

A liability theory maximizing efficiency and fairness will channel costs

189. As long as firms were realizing economies of scale and demand was growing, costs were being reduced and consumers did not complain. *See* L. HYMAN, *supra* note 51.

190. In November 1979, one prominent litigator wrote, "There are no decided cases setting out broad rules governing litigation about the construction of nuclear facilities. The controversies which have gone to litigation have been settled or are now *sub judice*." Evans, *Construction Litigation Involving Nuclear Facilities*, in NUCLEAR LITIGATION 203 (1979).

to responsible parties instead of passing them down the line. Although utilities and consumers may be willing to sue other industrial actors, these suits are procedurally and legally difficult and very expensive.[191] Design defects and changes, construction delays and stoppages, and faulty workmanship and materials all have a tremendous impact on the cost of nuclear plant development. Many of these problems are exacerbated by regulatory problems or changes in safety or technical requirements. Problems may result from the new and ever-changing state of nuclear technology. For example, a reactor vendor may rush its product to market without proper testing.[192] Other problems may arise from dissatisfaction with product or performance.[193] However, the concurrent and interrelated nature of the acts of parties at a nuclear plant site creates difficulties in identifying who is responsible for specific costs.

The question is whether conventional theories of construction defect litigation will govern disputes in nuclear plant construction, forcing industry actors to bear portions of the abandonment costs attributable to them. Nuclear litigation demonstrates the law-follows-policy formula. Nuclear regulation, generally considered to involve public law, has a direct impact on how private law rules are interpreted and applied. New litigation theories and strategies peculiar to nuclear power are emerging because of the size of construction projects, the length of time required to complete them, and the uneven distribution of experience among relatively few participants. Allocating contract and tort liability is further complicated by the role of government in encouraging construction, and by regulatory negligence. Private nuclear construction litigation involves opening up the contracting process, reassigning market risks, and attempting to impose tort and contract liability in light of the public nature of nuclear power.

Much of the litigation between utilities and corporations with whom they have contracted is an exercise in *post hoc* characterization. The utilities' posture is that they relied to their detriment on the expertise of more experienced industry personnel.[194] Since utilities did not have technical and scientific sophistication in nuclear power development, they

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191. Although many suits have been filed in the last six years, *see* Heiden, *Construction Litigation Involving Nuclear Power Plants*, in NUCLEAR LITIGATION 307 (1984), their costliness and complexities act as pressures to settle. This results in few judicial opinions on the substantive tort and contract issues in these cases.

192. Cincinnati Gas & Elec. v. General Elec. Co., No. C-1-84-0988 (S.D. Ohio, filed July 10, 1984) (Complaint).

193. *See, e.g.*, Niagara Mohawk Power Corp. v. Grauer Tank & Mfg. Co., 470 F. Supp. 1308 (N.D.N.Y. 1979) (contract terminated due to utility's dissatisfaction with performance and scheduling delays).

194. *See, e.g.*, Nebraska Pub. Power District v. General Elec. Corp., No. Civ. 75-L-142 (D. Neb. June 19, 1979) (court denied defendant's motion to dismiss plaintiff's claims that defendant breached express and implied warranties it would perform its duties as an expert), *noted in* Evans, *Civil Actions By Utilities*, in NUCLEAR LITIGATION 167 (1982).

were placed in a dependent position. Thus, utilities argue that they are victims of the long, collaborative, and self-insulating relationship between government and industry. As a result, they are entitled to compensation over and above that provided for in contracts. In this way, utilities commingle tort and contract theories to argue they are damaged by unfair or unconscionable transactions.[195]

The response by contractors and manufacturers is more straightforward and traditional. The contractors, vendors, architects and engineers argue that the rights, duties, and liabilities of the parties are set out clearly in contracts voluntarily negotiated by large, free commercial enterprises.[196] Liability thus has been predetermined and should not be reviewed in a courtroom.

The principal litigants at this tier are plants and contractors. Litigation attempts to shift costs to particular firms but not to individuals. Firms saddled with costs either incorporate the costs in their product or reduce earnings to shareholders. The principal cost-bearers, therefore, are consumers and investors. If overruns associated with nuclear construction accord with normal business risks, ratepayers have few complaints. However, cost overruns may be ten times the estimated cost projections for nuclear plants. Industrial actors allocate costs *inter sese*.[197] If a firm wins a damage award against another firm, then presumably the winning firm's costs are reduced. The owners or customers of the losing firm, who ultimately bear the costs, have cause to complain.

Investors and consumers argue that poor workmanship and design cause higher costs. Shareholders can sue utility managers on behalf of themselves as owners.[198] However, ratepayers and consumers are in a more difficult position because they are a step removed from the contracting process. They must assert a direct tortious injury, allege a statutory cause of action,[199] or claim they are intended third-party beneficiaries of the contract between owners and builders. So far such

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195. *See, e.g.*, Goldberg, *Unconscionability in a Commercial Setting: The Assessment of Risk in a Contract to Build Nuclear Reactors*, 58 WASH. L. REV. 343 (1983).

196. The heart of contract litigation between owners, builders, and suppliers of nuclear plants is the issue of the extent to which contract terms govern. Have the defendants adequately protected themselves with limitations of liability? Have they breached any warranties? Has their conduct gone beyond breach of contractual duty into the area of tort? Damages will be the most contested issue in this type of litigation. One author has noted:

> Although each case depends on its own facts, direct or general damages are usually recoverable in construction cases, while special or consequential damages are not. It is in [the] manufacturer's interest, however, to permit *some* recovery in order to avoid complete exculpation which is generally not favored as a matter of policy.

Evans, *supra* note 190, at 212.

197. *See, e.g.*, Heiden, *supra* note 191 *passim*.

198. *See, e.g.*, Rubin v. Dickhoner, No. C-1-83-1721 (S.D. Ohio, filed Feb. 21, 1984).

199. In Susquehanna Valley Alliance v. Three Mile Island Nuclear Reactor, 619 F.2d 231 (3d Cir. 1980), *cert. denied*, 449 U.S. 1096 (1982), the court held that no private right of action exists under the Atomic Energy Act. The AEA is therefore foreclosed as a way of avoiding abandonment costs.

cases have met with little success.

In *Pennsylvania v. General Public Utilities Corp.*,[200] the Commonwealth of Pennsylvania and two municipalities brought suit against the owners, operators, designers, and builders of the Three Mile Island nuclear electric power generating plant in connection with the accident at the facility.[201] The plaintiffs asserted jurisdiction under the Atomic Energy Act of 1954[202] and pendent jurisdiction as to state tort causes of action.[203] The Court of Appeals for the Third Circuit ruled that private litigants may not maintain an action under the Atomic Energy Act and affirmed the district court's grant of summary judgment on this count.[204] As to the pendent state claims, the Court of Appeals did not agree with the district court.[205] The plaintiffs had alleged negligence and willful misconduct in designing, constructing, and operating the nuclear facility and sought monetary damages for expenses incurred as a result of the accident.[206] Recognizing the novelty of the suit, the Court of Appeals remanded the case back to the district court for further development of the record. It said:

> This case presents important and at least factually unique issues involving the potential liability of designers, builders, owners and operators of privately-owned nuclear energy electric generating plants to pay damages to state and local governmental units and agencies in the event of a statutorily defined "nuclear incident." To pass upon these issues requires a record more complete than that before us and the district court.[207]

The case illustrates the difficult legal position in which consumers, as private litigants, find themselves. First, liability theories for nuclear abandonment costs are novel. Because they are undeveloped, courts are unfamiliar with the theories and a normal judicial response is to dismiss the action.[208] Second, the status of the third-party claimants, the consumers, is unclear. Should they have a legal right to sue contractors when the real injury, either due to breach of contract or negligence, lies with the firm? Third, it is difficult for consumers to find the appropriate forum. Should they file suit in federal or state court, or before a federal or state agency? Thus far no forum has been particularly receptive to such

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200. Pennsylvania v. General Pub. Utils. Corp., 710 F.2d 117 (3d Cir. 1983).

201. *Id.* at 119. The two municipalities were the Townships of Susquehanna and Lower Swarta. The townships sought to represent, in a class action, all municipalities and other public entities within a one-hundred mile radius of Three Mile Island. *Id.*

202. Pub. L. No. 85-256, 71 Stat. 576 (1957) (codified as amended in scattered sections of 42 U.S.C.).

203. 710 F.2d at 119. The district court granted summary judgment on all counts, terminating the actions. *In re* TMI Litigation Governmental Entities Claims, 544 F. Supp. 853 (M.D. Pa. 1982).

204. "The statute expressly provides that no action for violation of the Act shall be commenced except by the Attorney General of the United States." 710 F.2d at 119-20.

205. *Id.* at 120.

206. *In re* TMI Litigation Governmental Entities Claims, 544 F. Supp. 853 (M.D. Pa. 1982).

207. 710 F.2d at 123.

208. *Cf. In re* TMI Litigation Governmental Entities Claims, 544 F. Supp. 855 (M.D. Pa. 1982).

actions.[209]

In *County of Suffolk v. Long Island Lighting Co.*,[210] a municipality brought suit against the designers, suppliers, contractors and owners of a nuclear plant on behalf of itself and about 800,000 individual ratepayers of the utility, Long Island Lighting Co. (LILCO). Plaintiffs claimed that design and construction of the reactor was defective and asserted causes of action for negligence, breach of contract and warranty, and misrepresentation and concealment.[211] The relief sought included independent safety and health inspections and an injunction prohibiting LILCO from charging rates which included construction costs attributable to design or construction defects.[212] Although the plaintiffs claimed that the suit was basically a "pocketbook" action for economic damages, the Second Circuit found that plaintiffs were motivated by safety concerns and sought to regulate indirectly the radiological safety of the plant.[213] Both the district court and the Court of Appeals agreed that the ratepayers' safety related claims were preempted by federal law.[214]

In addressing the economic issues relating to plant cost, the Court of Appeals agreed that the Public Service Commission has exclusive jurisdiction over all requests for retrospective and prospective rate relief.[215] The common-law causes of action were precluded because state law did not allow recovery for economic loss.[216] Breach of warranty and contract claims were unsuccessful because the utility ratepayers were not in privity of contract with the defendants furnishing the faulty work.[217] LILCO's objective in entering into contracts with suppliers and contractors, reasoned the court, was to benefit its shareholders upon completion of the facility and not to benefit the utility's customers. Therefore suit was precluded.[218]

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209. The Third Circuit, in Pennsylvania v. General Pub. Utils., noted: "Our decision will not preclude the district court from considering any renewed motion for summary judgment or other appropriate disposition of the claims short of a trial, upon establishing of record the material facts." 710 F.2d at 123-24.

210. County of Suffolk v. Long Island Lighting Co., 728 F.2d 52 (2d Cir. 1984).

211. *Id.* at 56.

212. *Id.* at 55.

213. *Id.* at 60.

214. *Id.* at 56; County of Suffolk v. Long Island Lighting Co., 554 F. Supp. 399 (E.D.N.Y. 1983).

215. 728 F.2d at 62.

216. *Id.* at 62-63.

217. *Id.* at 63.

218. The Second Circuit's opinion can be criticized on three grounds. First, their discussion of federal preemption is not quite accurate. In *Pacific Gas & Electric*, the Supreme Court made clear that the states have power over such things as "the need for additional generating capacity, the type of generating facilities to be licensed, land use, ratemaking, and the like." 461 U.S. at 212. The Court further stated, "[M]oreover, Congress has allowed the states to determine—as a matter of economics—whether a nuclear plant vis-a-vis a fossil fuel plant should be built." *Id.* at 222. Finally the Court noted that "the legal reality remains that Congress has left sufficient authority in the States to allow the development of nuclear power to be slowed or even stopped for economic reasons." *Id.* at 223. The Second Circuit's federal preemption analysis in *Long Island Lighting Co.* ignored the Supreme Court's clear language, stating: "In sum, federal preemption encompasses both safety and

Third parties seeking to recover against contractors and designers for incurring unnecessary costs will confront many of the same issues raised in *Long Island Lighting Co.* Many common-law causes of action will be frustrated by the lack of privity between ratepayers and contractors. The rate relief avenue is frustrated because of forum unfriendliness and complexity of the issues that are heard by PUCs. Private relief before the NRC is limited by statute.[219] Ratepayers occupy an odd status, since they are involved in neither the policymaking nor contracting stages but are likely candidates for liability. Shareholders occupy a similar status. They are little involved with planning or operational decisions but may ultimately bear the costs of plant abandonment. In an effort to avoid abandonment costs, shareholders can either sue the designers, suppliers, contractors and owners of the plant, with rather dim prospects for success, or can charge management with a breach of fiduciary duty.

C. *Third Tier*

The third tier of liability for abandonment costs is comprised of those persons most likely to pay for the nuclear mistake. Taxpayers have already been mentioned, and are liable whenever government is held responsible. Two groups remain: consumers and investors. In the second tier, the primary industrial actors fight to shift the fault, and costs, to other industrial actors. To the extent that a public utility, the entity responsible for the decision to build or abandon a plant, is unable to recoup its losses from other sources, the costs are passed on to utility investors, or are suffered by the ratepayers. If private firms are charged with abandonment costs, the expense will be shifted to shareholders or consumers of the firms' products or services. Therefore, the single most important cost allocation issue appears to be a confrontation between

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productivity, and a successful energy policy must strike a delicate balance between the two." 728 F.2d at 60. The court's federal preemption discussion, which notes the obvious point that there is some interaction between safety and economic issues, does not honor the distinction made by the Supreme Court.

Second, the court discussed state statutory preemption. 728 F.2d at 60-62. The New York Public Service Commission (PSC) generally looks narrowly at ratemaking issues and concentrates on the revenue requirement. The PSC has worked itself into a cozy, if not interdependent, relationship with the utilities. The aim of both the PSC and the utilities is how best to develop a rate formula that will keep the utility afloat. The PSC and utilities keep adding more costs into the rate base. Although it is true that ratemaking is part of the Commission's daily work, it does not follow that the PSC has jurisdiction to look at issues raised in the County's complaint. Such questions as liability to consumers for contractor mismanagement or utility mismanagement, and NRC conduct are generally not examined by the PSC. Therefore, the court was in error in stating that the New York Public Service Law preempts these other claims.

The final problem with the opinion is that it misread Martin v. Julius Dierck Equipment Co., 43 N.Y.2d 583, 374 N.E.2d 97, 403 N.Y.S.2d 185 (1978), to preclude state common-law actions. 728 F.2d at 62-63. *Martin* was a choice of law conflicts case which dealt with whether the proper characterization of a products liability cause of action was tort or contract.

219. Berghoff, *NRC Regulations as a Standard for Legal Actions: Has the Public Shield Been Forged into a Private Sword?*, in NUCLEAR LITIGATION 57 (1984).

consumers and investors, also referred to as shareholders and ratepayers. However, the confrontation is "apparent" only if discussion of cost allocation stops with the third tier. If viewed as a confrontation at this level, then the mismatch between liability and responsibility remains obscured.

Consumers and investors share a common fate. These groups are last on the list in terms of responsibility, and both generally lack an opportunity to choose regulatory policy or direct corporate strategy. They are, however, the most likely candidates upon whom the abandonment cost burden will be imposed.[220] Cost allocation discussions which pit these two groups against each other move debate away from the primary decision-makers and into a liability analysis disassociated from any notion of responsibility. Corporate policies which lessen liability are inefficient. Imposition of liability without correlative responsibility is unfair.

The case for imposing costs on ratepayers and consumers is similar to the argument made for cost-spreading to taxpayers. Ratepayers can more easily absorb costs because costs are spread more thinly. Further, ratepayers are the beneficiaries when utilities are kept strong and viable. After all, ratepayers must have some assurance of reliable service. Dependable, continuous service prevents the problems accompanying brown-outs or black-outs but, more importantly, utilities are required by law to maintain service.[221] Thus, from the utilities' point of view, they are only doing what they are required to do by law; provide electricity. Proposed nuclear facilities are part of a long-range plan which was not successful due to unpredictable national and international market forces. The price hikes of the 1970's, together with conservation measures, have resulted in declining demand and have made nuclear plants unnecessary.[222] These arguments comprise the case for placing costs on ratepayers, but they are not universally accepted.

Some states, as a matter of law, refuse to place these costs on ratepayers under the theory that ratepayers should only pay for the electricity they receive.[223] Other states similarly refuse as a matter of policy. The hard question that must be addressed is: should cost-of-service pricing, in which the ratepayer pays for what is received, be retained by a regulatory system that must supervise an industry with lead times of over a decade,

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220. *See* Howe, *supra* note 142.

221. A. PRIEST, PRINCIPLES OF PUBLIC UTILITY REGULATION: THEORY AND APPLICATION (1969).

222. *See, e.g.*, Cook, *supra* note 38.

223. The simple test for cost-of-service ratemaking is called the "used and useful" test. Ratepayers will only be charged for a nuclear plant which is on line and operational. *See* Dakin, *The Changing Nature of Public Utility Regulation*, 45 LA. L. REV. 1033 (1985). The advantage of the test is that it is simple to apply. However, a test should have more than administrative ease to recommend it. The downside to the "used and useful" formula is that it creates an incentive for managers to continue to pour money into a project, e.g., convert a nuclear plant to coal rather than cancel when the plant is no longer needed.

and with technologies barely out of experimental stages?

The case for imposing liability on shareholders and bondholders is based on hard pragmatism and faulty logic. Most electric utilities, like private corporations, are investor-owned. Shareholders as owners theoretically make decisions which run the corporation. Shareholders, therefore, are responsible for corporate decisions. The fallacy in the syllogism is that the middle proposition, that shareholders make decisions which run the corporation, is not true for large modern corporations. Shareholders technically own the utility but they do not run it. Their status as owners has significance only *vis-a-vis* corporate finance. Shareholders may be more accurately described as investors basing investment decisions on corporate pronouncements on the health of the utility. Shareholders buy and sell fungible goods, that is stocks, in the marketplace. Daily as well as long-term operations are handled by utility managers, or directors. Bondholders are similarly situated because their investment decisions are based on information controlled by government and industry.

A choice between cost spreading to ratepayers or investors is grounded in a relative policy choice designed to minimize the burden of liability. Imposition on ratepayers spreads costs more thinly and saves widows and orphans holding utility stocks and bonds from that burden. Essentially, determining who will bear abandonment costs is a balancing of the competing interests of investors and ratepayers. These two groups are the "victims" of a variety of situations ranging from delays in construction and mismanagement, to negligent government supervision, and costs are imposed upon them for the purpose of maintaining the financial integrity of utilities.[224]

D. *The Traditional Model Revisited*

It is interesting to note the zero-sum nature of the abandonment costs game. The billions of dollars attributed to the over-investment in nuclear plants must come to rest someplace. According to the three-tiered structure of liability, the most likely resting place is at the bottom of the liability ladder. "Government" and "industry" both effectively avoid imposition of liability costs. The government easily passes the costs through to taxpayers. The nuclear "industry," comprised of contractors, equipment vendors, architects and engineers, and utilities, uses two powerful arguments for avoiding payment. First, industry argues that the fault lies with government, in pushing a policy too hastily. Second, utilities assert that the law requires them to invest and allows them to earn a return on their investment from ratepayers. Thus, industry passes the costs on to ratepayers.

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224. *See* P. NAVARRO, *supra* note 129.

The inequity in this scheme of liability lies in an absence of responsibility from decisionmaking. Those with the least participation and who benefit only intangibly, the persons in the third tier, become the targets for the abandonment costs. A liability theory honoring the virtues of responsibility and participation must be central to any regulatory reform. More concretely, neither consumers nor investors should be forced to pay for mistakes of firms' managers. Likewise, taxpayers should not be scapegoats for government errors.

The lesson of this Part is that there is an inverse relation between liability and responsibility endemic to nuclear regulation. The reasons marshalled in favor of the cost allocation scheme dictated by the traditional model are based upon abstractions and myth as much as they are based on pragmatic justifications. Someone must pay abandonment costs. After "government" and "industry" are revealed to be conceptualizations, and when it is shown that organizations and agents of government and industry are well-immunized against liability, then the final battle of cost allocation is waged among ratepayers, consumers, shareholders, bondholders, and taxpayers. Although imposing abandonment cost liability on this last tier may be unfair, it is efficient. The best case, perfect alignment of liability with responsibility, does not and cannot exist because "government" and "industry," those entities most responsible, do not exist. Therefore, a cost spreading strategy must be based on a second-best case.

If financial liability is to be more closely aligned with policymaking responsibility, those persons targeted as cost-bearers should have either a greater role in policymaking or a set of legal rules available to them for cost avoidance. Two fundamental reforms suggest themselves. The traditional responsibility/liability model must be redefined: either costs should be imposed up the line, for example greater personal exposure by second-tier actors, or third-tier parties should more directly participate in decisionmaking. Either choice starts to realign the old model and promises more fairness and better efficiency.

The new model's element of greater participation is fairer because those affected by the policy help determine their fiscal fate. The new model also encourages efficiency because it discourages bad investment decisions by reducing the incentives to over-invest. If nuclear regulation is to respond satisfactorily to its current ill-health and be receptive to a more sound nuclear policy, the regulatory system must realign financial liability with policymaking responsibility in a way that promotes fairness and efficiency. This realignment will only occur once policymakers recognize that large-scale electricity production no longer merits the protections it has enjoyed.

IV. BEYOND TRANSITION

For now, and for the foreseeable future, nuclear power is not a financially attractive investment. The transitional period is depicted by two phenomena: the shift in concern from safety to finances, and the decentralization of decisionmaking power and authority. These characteristics form the basis for the regulatory reforms needed to spread costs fairly and efficiently and which will develop a prospective nuclear policy. How the legal system allocates costs will be reflected in monthly utility bills and will have an impact upon the viability, structure, and design of the electric utility industry and consequently on the country's energy program. Even though the country could survive without nuclear energy, a pragmatic justification for nuclear power does not remove the need for a significant reorientation of nuclear power and electricity regulation, decisionmaking, and policymaking. What remains is to design a mechanism that will determine the contours of future policy.

The interaction of law and policy is such that the institutional biases, decisionmaking principles, and policymaking goals which are factored into the resolution of socio-economic problems, remain after the immediate problem is resolved and so influence policy for decades. Past institutionalized policy choices and structural arrangements are a primary cause of the current problem of nuclear abandonment costs and must be rearranged. Likewise, the decisionmaking system and the regulatory structure developed in response to the failed nuclear policy will become institutionalized and entrenched in our legal, political, and economic cultures, but they will not constitute a permanent rearrangement.

The financial failure of commercial nuclear power is no more the result of pure market failure than it is the consequence of regulatory failure. Instead, the industry's state of poor health is better diagnosed as a case of regulatory/market failure during the advanced stages of capitalism in an activist state. This means simply that the failed nuclear power venture is the failure of a joint government-industry enterprise looking for a place to spread the costs of unanticipated and unwanted risks. The traditional model's method of allocating abandonment costs dictates that ratepayers will pay the bulk of the costs; utilities will have little incentive for cost avoidance; state and federal regulators will remain impatient, if not hostile, to consumer interests; and large scale electric power plants will proliferate inefficiently.

The need for a new policymaking and decisionmaking structure is further demonstrated by the rupture in the unified promotional policy endorsed by government and industry. The divergence between government and industry is evident in a Congress which asks industry to absorb

waste disposal costs[225] and which requires utilities to absorb decommissioning costs,[226] and in state utility commissions which are protective of consumer interests by disallowing abandonment costs in the rate base.[227] The break is also evident in judicial decisions that attempt to impose liability on industry,[228] and in state legislatures which respond with industry-checking legislation.[229] Further, the tear is evident among industry participants. Utilities are bringing multi-million dollar lawsuits against architects, reactor vendors, and engineering contractors for design, manufacturing, and construction mistakes.[230] Shareholders are suing management for breach of fiduciary duty for choosing the nuclear path and for continuing down that path despite financial danger signals.[231] Likewise, large and small customers are suing utilities in the hope of preventing costs from being passed through to them.[232]

The legal and policymaking system stands at an important crossroads during this transitional, post-TMI phase. The crisis atmosphere is gone as a matter of public consciousness, if not of policy choice. The respite provides the opportunity to evaluate the success or failure of particular substantive positions; the role of the central government in the design of a promotional nuclear policy; and the responsibility of industry for its mistakes. The transitional period is one of retrenchment and rethinking as well as a period with its own peculiar problems and characteristics. Chief among the signs of the period is a search for nuclear power's identity. The once strong faith in the power of the atom to solve energy problems has been shaken badly. The conscious acceptance of this lost faith is endemic to a full realization of an irreducible and intractable fact about law and legal institutions; they reflect human frailty as much as they are responsive to human aspiration. Accepting the human dimension of nuclear power is the single most important realization that society must face during the transitional stage. Human and political sensitivity is a prelude to a fuller understanding of nuclear regulation and can lead to a better, more responsive policy.

There is a profound, possibly disturbing, irony about the transition process. TMI was a safety accident and near catastrophe. Yet, society occupies itself with analyzing the financial and market aspects as if the image of a core meltdown is too horrible to contemplate. Society disregards the safety aspects and concentrates on something more

225. *See* Nuclear Waste Policy Act of 1982, Pub. L. No. 97-425, 96 Stat. 2201 (codified at 42 U.S.C. §§ 10101-10226).

226. *See* ENERGY INFORMATION AGENCY, PUB. NO. DOE/EIA-0438(84) COMMERCIAL NUCLEAR POWER 1984: PROSPECTS FOR THE UNITED STATES AND THE WORLD 34 (Nov. 1984).

227. *See, e.g.*, Ohio Consumers' Counsel v. Pub. Util. Comm'n, 4 Ohio St. 3d 111 (1983).

228. *See, e.g.*, Pennsylvania Elec. Co. v. Pennsylvania Pub. Util. Comm'n, 502 A.2d 130 (1985).

229. *See, e.g.*, OR. REV. STAT. § 737-355 (1979).

230. *See* Heiden, *supra* note 191.

231. *See* Rubin v. Dickhoner, No. C-1-83-1721 (S.D. Ohio, filed Feb. 21, 1984).

232. *See* County of Suffolk v. Long Island Lighting Co., 554 F. Supp. 399 (E.D.N.Y. 1983).

quantifiable; namely costs. Instead of focusing on the softer issues of human frailty and lack of political accountability as possible causes of human annihilation, the public turns its attention to the hard question of finances. *Pacific Gas & Electric* reinforces the move from safety to finances by relying on an economic/safety distinction. The more important political message of *Pacific Gas & Electric*, the decentralization of decisionmaking power, must not be ignored.

The focus on finances opens debate about the place of nuclear power in our society. The danger is that, by overly concentrating on fiscal and market implications, a seductive path is presented. This path leads to lower safety standards as a means of insuring the financial integrity of the utilities. This mistake ignores the main lesson of the transitional period. If nuclear technology is only as reliable as the actors that regulate and operate the industry, and if the momentum of that technology has carried society farther than the regulatory state can currently handle, then perhaps it would be wise to be cognizant of the dislocation and to redesign the regulatory system so that it can keep pace with the technology. The human and political dimensions must be factored into the decisionmaking and policymaking processes rather than disassociated from them.[233]

V. CONCLUSION

A more open and responsive process by which complex technological decisions can be made must be established. This restructuring may well mean the abolition and then reconstruction of the NRC.[234] A more participatory process approach for decisionmaking and policymaking in the nuclear area is warranted on several counts. First, the very nature of the problems and issues surrounding nuclear power are varied. In recent legal literature they have been categorized as polycentric problems, because they are complex, contain numerous uncertainties, affect different interest groups in varying degrees, and in the case of nuclear power,

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233. An interesting debate is developing between persons labelled "Separatists" and "Non-Separatists" who argue whether it is possible to keep techno-scientific questions separate from legal-policy issues. *See* Yellin, *Institutional Designs*, *supra* note 105; Carter, *Separatism and Skepticism*, 92 YALE L.J. 1334 (1983). This debate is a semantic exercise about labels and locating the gray area between the two sets of topics. Some things are scientifically accepted, e.g., the atomic weight of U-238. Others, such as the long term effects of low level radiation, are not scientifically known and are "policy" matters. The best system is one that encourages interaction between these sets rather than ignoring the gray area. Questions about risk are essentially mixed fact-value questions. *See supra* note 93 and accompanying text. The Separatist/Non-Separatist dichotomy is also prevalent in administrative law scholarship. *See, e.g.*, Frug, *supra* note 9, at 1298, noting: "Values, ends, and desires—the subjective part of the human personality—are the attributes of the constituents who control the bureaucracy rather than the bureaucracy itself."

234. It is the intent of this section of the Article to identify the themes and values of the transitional period rather than propose specific reforms. However, a major reorientation or abolition of the NRC has been suggested by other analysts. *See* SAFETY SECOND, *supra* note 63, at 225-30; REPORT TO THE PRESIDENT'S COMM'N, *supra* note 76, at 61-67.

are transgenerational.[235] Polycentric problems are as normative and political as they are scientific and technical.[236]

Second, and more significantly, there is no fixed answer to many questions about nuclear power. Safety and risk assumptions are matters of degree and, consequently, become matters of politics. Nuclear plants will never be absolutely safe. Safety, together with cost issues, can be satisfactorily resolved only through the design of a politically and socially acceptable decisionmaking system.[237] Though the system necessarily will be imperfect in a scientific sense, it is possible to create a system that reflects the nature of the issues and the virtues of a democratic polity.

Third, nuclear power requires a process approach because of its peculiar place in our culture. The joint government-industry venture has created a configuration that is neither purely public and democratic nor purely private and capitalistic. Decisions regarding nuclear power were not made exclusively in the free market, nor were they made as a matter of pure political preference. The public-private combination requires a process through which public policy preferences and normative value choices can be made. A key element of a more responsive and responsible regulatory system is democratic participation. Participation, given low priority in the current structure, is consistent with resolving polycentric problems for which there are no fixed answers because there is a vast gray area between purely technological or scientific issues and purely legal or political questions. While experts may help illuminate the techno-scientific data, they are not better equipped than the public to assess the values inherent in public policy choices.

Having identified the primary characteristics of the transitional period

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235. A "polycentric" decision is described by Professor Lon Fuller:

> We may visualize this kind of situation by thinking of a spiderweb. A pull on one strand will distribute tensions after a complicated pattern throughout the web as a whole. Doubling the original pull will, in all likelihood, not simply double each of the resulting tensions but will rather create a different complicated pattern of tensions.

Fuller, *The Forms and Limits of Adjudication*, 92 HARV. L. REV. 353, 395 (1978). See also M. WESSEL, SCIENCE AND CONSCIENCE 4-10 (1980) (CALLING THESE COMPLEX PROBLEMS "SOCIO-SCIENTIFIC" DISPUTES); YELLIN, *High Technology*, *supra* note 105, at 495-508. Nuclear issues are not only technically and scientifically complex, they also contain competing normative (political, philosophic, economic and social) uncertainties. *See, e.g.*, R. GOODIN, POLITICAL THEORY AND PUBLIC POLICY 187-219 (1982). In their work on risk decisions, the authors of ACCEPTABLE RISK identify five "generic" complexities:

> (a) uncertainty about how to define the decision problem, (b) difficulties in assessing the facts of the matter, (c) difficulties in assessing the relevant values, (d) uncertainties about the human element in the decision-making process, and (e) difficulties in assessing the quality of the decisions that are produced.

B. FISCHHOFF, *supra* note 93, at 9.

236. *See supra* note 233.

237. One authority notes:

> Hence choosing an approach is a political act that carries a distinct message about who should rule and what should matter. The search for an objective method is doomed to failure and may obscure the value-laden assumptions that will inevitably be made.

B. FISCHHOFF, *supra* note 93, at xii.

as a focus on cost-spreading and decentralization, the regulatory response should create a regime for future policy-making which reflects these elements. The themes of the new regime are the traditional values of responsibility and participation. The failure of the nuclear program has been essentially a failure of the primary actors to accept responsibility for their decisions. Correlatively, the persons most affected by commercial nuclear power programs, consumers, have little say in the decisionmaking process and are targeted to absorb the costs of these decisions. The failure to allow an avenue of participation is a failure of the democratic process that must be corrected. Therefore, the hallmark of the transitional period is the search for a more responsive regulatory regime.

The postmodern era of nuclear development is a period of retrenchment, arising from a growing public concern about safety, from an increasingly skeptical financial community, and from a legal system reflective of those concerns, if not acutely responsive to them. This Article serves as a prelude to a discussion of the second era of nuclear regulation. The second era will be self-conscious about the place of nuclear power in the country's energy program. Further, the unified promotion of nuclear power as a central contributor to expanding electricity production will no longer exist. Finally, during the next era, hard questions about the interrelationship between government and industry in a high technology world must be asked with specific reference to the scope of public participation. This reexamination should lead to a correction of the financial dislocation of large projects and should reassess the role of nuclear power as a transitional resource.