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Nuclear Transition: From Three Mile Island to Chernobyl

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NUCLEAR TRANSITION: FROM THREE MILE ISLAND TO CHERNOBYL

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I. INTRODUCTION

The regulation of the commercial nuclear power industry in the United States is experiencing a radical transformation caused by dramatic changes in nuclear power markets and politics. Nuclear power, once the hope and envy of energy suppliers, has been a costly mistake.[1] For nearly a decade, no one has invested in new

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1. Professor Richard Pierce defines a mistake or a "mistake in retrospect" as a project "that would not have been initiated ten years ago if the sponsors had known then what they know today." Pierce, *The Regulatory Treatment of Mistakes in Retrospect: Canceled Plants and Excess Capacity*, 132 U. PA. L. REV. 497, 498 (1984). Everyone has 20-20 hindsight, however, so few of us would make such mistakes. Furthermore, Pierce's definition applies to the behavior of utilities in investing in nuclear power. This Article uses a broader definition of mistake and applies it to government as well as industry. The nuclear mistake was an over-ambitious government and industry joint venture that was insensitive to economic and political factors, thus raising costs beyond what the market could bear. The mis-

domestic nuclear plants. Instead, regulation is occupied with existing and nearly on-line plants. Furthermore, the nuclear transition has uncovered unanticipated costs attributable to emergency evacuation, plant decommissioning, and waste disposal. Society is now in the process of identifying and allocating these costs. The consequence of these changes is clear. No more nuclear power plant construction will occur in the United States until costs are lowered and industry safety claims receive wide public acceptance. These twin conditions are necessary for any reemergence of nuclear power. This Article addresses the economic and political displacement and realignment of nuclear regulation during the period of transition from the traditional model of regulation to the emerging post-industrial model.

The nuclear transition is not discrete; the government did not announce and implement a conscious policy change.[2] Instead, the change is largely unconscious and is taking place gradually. The transition dates from March 28, 1979, the date of the incident at Three Mile Island, to April 26, 1986, the date of the Chernobyl accident. TMI and Chernobyl serve as more than convenient mileposts in the history of nuclear power. These accidents are stark reminders of the complexities, risks, and costs of government sponsored and regulated enterprises. Furthermore, and more impor-

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take manifested itself in investments in plants that were either cancelled or added to excess electrical production capacity, and whose construction costs were grossly underestimated. *See infra* notes 111-13 and accompanying text.

2. In an article about legal transition, Professor Louis Kaplow argues that for government to provide relief for changes in policy is inefficient. In explicating his thesis, he makes, then relaxes, two assumptions: "First, the analysis assumes that the transition policy to be employed in a given context is well-known in advance and will be followed consistently in the future . . . . Second, the discussion assumes that the reforms themselves are desirable at the time they are made." Kaplow, *An Economic Analysis of Legal Transitions*, 99 HARV. L. REV. 509, 520-21 (1986). Furthermore, Kaplow's heuristic analysis of legal transition depends on a discrete event. Policy *X* exists at Time One, and then policy *Y* governs at Time Two. *Id.* at 607. He uses tax reforms and eminent domain takings as examples. *Id.* at 602.

This Article's analysis of transition relies on neither assumption. The transition policy is unknown; hence, its desirability is likewise unknown. Moreover, the transition is not discrete; it takes place over a period of time. The nuclear policy that existed from World War II until 1979 is being replaced by an as yet unacknowledged emerging nuclear policy. This Article concentrates on the developmental period for nuclear policy after 1979.

Despite the differences in assumptions and models, this Article reaches the same conclusion as Kaplow regarding government relief: Transitional relief is inefficient and perpetuates a wrong set of signals about risks and incentives in the nuclear and electricity markets.

tantly, the events that occurred between these dates have significantly changed the direction of the nuclear and electric industries.

Two overriding characteristics comprise the nuclear transition.[3] The first is a shift in emphasis from safety to finances.[4] The primary fallout from TMI was financial, not radioactive. In contrast, the real radioactive fallout of Chernobyl can serve as the catalyst refocusing attention on safety.[5] The second characteristic is the decentralization of decision making away from the central government toward the states, best exemplified in *Pacific Gas & Electric Co. v. State Energy Resources Conservation and Development Commission.*[6] Together, these market and political forces combine to alter nuclear regulation.

Prior to TMI, commercial nuclear power enjoyed wide and at times uniform support. The government saw commercialization as a way to expand the country's technological superiority, the industry saw nuclear power as a source of great profits, and the public saw cheap and nearly inexhaustible energy.[7] People assumed that nuclear plants were safe and that safety was affordable because of the great economies of scale that nuclear plants offered. At that point, however, the country underwent a loss of faith in nuclear

3. The two themes of the transition are developed more extensively in Tomain, *Law and Policy in the Activist State: Rethinking Nuclear Regulation*, 38 RUTGERS L. REV. 187, 201-12 (1986); Tomain, *Nuclear Regulation in Transition*, 17 PROGRESS IN NUCLEAR ENERGY 245 (1986).

4. Safety issues did not evaporate although they did seem to take a back seat during this period. *See* UNION OF CONCERNED SCIENTISTS, SAFETY SECOND: A CRITICAL EVALUATION OF THE NRC'S FIRST DECADE (1987).

5. The initial industry and government reactions to the Chernobyl accident expressed concern for safety. Soon, however, it was business as usual for the domestic nuclear industry. *See Hearing before the Comm. on Energy and Natural Resources*, S. Hrg. 99-869, 99th Cong., 2nd Sess. 2, 31 (1986) (testimony of Harold R. Denton, Director Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission) ("Based on the information available to us now, we have concluded no immediate changes in our regulatory practices and policies are necessary."); *Gauging the Fallout from Chernobyl*, PUB. UTIL. FORT., May 29, 1986, at 44, 44 ("Despite these concerns, the Chernobyl disaster has had little substantive short-term effect on commercial nuclear power in this country.").

6. 461 U.S. 190 (1983).

7. The uniform acceptance of a promotional nuclear policy is standard regulatory history. *See, e.g.*, G. MAZUZAN & J. WALKER, CONTROLLING THE ATOM: THE BEGINNINGS OF NUCLEAR REGULATION 1946-1962 (1985). This is the "official" history of nuclear regulation commissioned by the Nuclear Regulatory Commission. *See also* Lanouette, *Atomic Energy, 1945-1985*, WILSON Q., Winter 1985, at 91.

power. This loss of faith was not only a metaphorical abandonment, it was also an actual abandonment expressed through plant cancellations. It manifested itself in the marketplace as financing for new plants dried up. Concomitant with market failure was bureaucratic failure. The loss of faith also extended to a disenchantment with centralized decision making. The traditional expertise model of bureaucracy[8] gave way as the states gained decision-making authority. These factors became the essence of the nuclear transition.

This Article explores the lessons of the nuclear transition. Part II describes the nuclear market and the signs of fatigue. Part III discusses the political and regulatory responses to market failure. Decision makers[9] were simply unwilling, perhaps unable, to let nuclear power die a natural market death. Instead, the regulatory system almost uniformly accommodated the weakening financial condition of the nuclear industry by apportioning losses between ratepayers and shareholders rather than letting the industry absorb all losses. Transitional relief through loss allocation to ratepayers is not defensible from an economic standpoint because the accommodations skew the risks and incentives of nuclear regulation and promote inefficient over-investment.[10] The accommodations are understandable politically, however, as explained in Part IV. Briefly, nuclear market failure and the political responses it engendered have demonstrated the need for a new regulatory model. Even though the de facto government relief accorded the industry has delayed what is most likely an inevitable change in

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8. *See, e.g.*, Frug, *The Ideology of Bureaucracy in American Life*, 97 HARV. L. REV. 1277, 1318-34 (1984) (discussing the "expertise" model); Stewart, *The Reformation of American Administrative Law*, 88 HARV. L. REV. 1169, 1671-88 (1975) (discussing the "traditional" model).

9. Decisions affecting nuclear power are made at every level and by every branch of government. State utility commissions and state judges made most of the decisions discussed in this Article. Still, the reader must realize that a variety of decision makers exist and that "nuclear policy" is not delineated by any one decision maker. Rather, it is the result of a complex policy-making process. *See generally* Tomain, *Institutionalized Conflicts Between Law and Policy*, 22 HOUS. L. REV. 661 (1985) (discussing the decision-making difficulties that arise because of the conflict between law and policy).

10. *See* Averch & Johnson, *Behavior of the Firm Under Regulatory Constraint*, 52 AM. ECON. REV. 1052 (Dec. 1962); Kaplow, *supra* note 2, at 527-32. *See generally* Quinn & Trebilcock, *Compensation, Transition Costs, and Regulatory Change*, 32 U. TORONTO L.J. 117 (1982) (efficiency gains from transition relief are indeterminate).

utility regulation, the accommodations have forced policy makers to question basic assumptions. The traditional capital-expansionist model of utility regulation that has existed for the last century must be replaced by a more competitive market-centered post-industrial model. The transition exposed the weaknesses of the traditional model and revealed the contours of the next era of nuclear power and electricity regulation. The consequences of nuclear transition range widely beyond changes in administrative agency regulations and affect federal and state regulation of nuclear power, the delivery and regulation of electricity, and the relationship of government and industry in a high-technology world.

II. The Nuclear Power Market

A. Introduction

The unequivocal message from the marketplace is that the nuclear industry is dead.[11] Given the billions of dollars invested over the last four decades, one wonders if this obituary is premature.[12] Nevertheless, the poor financial health of the nuclear industry was real. The industry has resuscitated itself financially by appealing to regulators. The central insight about nuclear power and its regulation is that the bureaucratic state created the nuclear market. That market no longer functions smoothly, however, and its failure has resulted in an uneven and unfair distribution of risks and costs and an inefficient set of incentives.

Because the nuclear industry is nonintegrated in that no one type of firm controls the entire fuel cycle from mining to electricity distribution, studying a single entity or group of entities is inaccu-

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

12. *See* M. HERTSGAARD, NUCLEAR, INC.: THE MEN AND MONEY BEHIND NUCLEAR ENERGY 7 (1983) (asserting that $400 billion was spent in 1981); Rodgers & Gray, *State Commission Treatment of Nuclear Plant Cancellation Costs*, 13 HOFSTRA L. REV. 443, 443 n.3 (1985). Regarding a reemergence of nuclear power, see TECHNOLOGY FUTURES, INC. & SCIENTIFIC FORESIGHT, INC., PRINCIPLES FOR ELECTRIC POWER POLICY ch. II (1984) [hereinafter PRINCIPLES FOR ELECTRIC POWER POLICY]; Klueh, *A Second Nuclear Era?*, PUB. UTIL. FORT., Oct. 31, 1985, at 15; Sillin, *Managing to Reduce Nuclear Financial Risks*, PUB. UTIL. FORT., Oct. 11, 1984, at 26. Nuclear power may reemerge if a large reindustrialization of the economy occurs that requires mega-plants, or, more likely, if utilities build smaller, cheaper plants and nuclear power increases in its public acceptability. For a discussion of the importance of public acceptance, see Finger, *Public Approval of Nuclear Power: Beyond the Short Term*, PUB. UTIL. FORT., Feb. 7, 1985, at 15.

rate. The primary actors in the nuclear financial drama, however, are investor-owned utilities, which generate about eighty percent of the country's electricity, fourteen percent of which is nuclear.[13] Utilities make the initial decision to build the plants, then enter into contracts with reactor vendors, architects, engineers, and contractors to equip, design, and build the plants. Consequently, without power plant orders the bottom falls out of the nuclear industry. This collapse has happened. No new nuclear plants have been ordered since 1978, and all plants ordered since 1974 have been cancelled.[14]

Another clarification about the nuclear industry is necessary. No utilities are committed exclusively to generating electricity from nuclear power. Instead, electric utilities wisely use a mix of fuels.[15] Thus, the health of nuclear utilities is interdependent with the health of the electric utility that has chosen to go nuclear.[16] Consequently, to understand the nuclear market, one must understand the market for electricity.

Public utilities occupy an odd status in a capitalist democracy. As regulated firms, they are caught between political and market forces and must serve two masters. They must satisfy the demands of the market in their attempts to raise capital, and they must satisfy the service obligation imposed upon them by government. At the same time, they are measured against comparable competitive industries and are partially insulated from market risks. Utilities, thus, are primarily privately owned and are publicly regulated. The private/market, public/nonmarket nature of nuclear utilities un-

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13. Federal, state, local, and cooperative utilities generate the remainder. W. Fox, FEDERAL REGULATION OF ENERGY § 30.01 (1983); *see also* P. JOSKOW & R. SCHMALENSEE, MARKETS FOR POWER: AN ANALYSIS OF ELECTRIC UTILITY DEREGULATION 12, tables 2.1 & 2.2 (1983).

14. ENERGY INFORMATION ADMIN., U.S. DEP'T OF ENERGY, NUCLEAR PLANT CANCELLATIONS: CAUSES, COSTS, AND CONSEQUENCES ch. 2 (1983) [hereinafter NUCLEAR PLANT CANCELLATIONS]; *see also* ENERGY INFORMATION ADMIN., U.S. DEP'T OF ENERGY, U.S. COMMERCIAL NUCLEAR POWER: HISTORICAL PERSPECTIVE, CURRENT STATUS AND OUTLOOK 10, table 1 (1982).

15. In 1981, for example, electricity was produced: by coal (52%), natural gas (15%), nuclear (12%), hydropower (11%), oil (9%), and by other sources (1%). W. Fox, *supra* note 13, at 750.

16. *See infra* text accompanying notes 45-103 (comparing nuclear and non-nuclear utilities). This Article distinguishes between these two types based on utility construction. Utilities with active nuclear construction programs are denoted as nuclear utilities. *See infra* note 46.

derscores the political and economic dimensions of utility regulation. In an attempt to unravel the mixed nature of nuclear power, this Part discusses the economic assumptions, financial indicators, and rate-making principles behind nuclear regulation.

B. Economic Structure

In a competitive market, numerous buyers and sellers exchange numerous substitutable goods so as to maximize productive and allocative efficiencies and to encourage innovation.[17] The most desired products at the most desired prices stay in the market, while other products drop out. Due to various imperfections, however, not all markets are competitive.[18]

The nuclear power market has three notable imperfections. First, commercial nuclear power could not exist without government financial sponsorship. The nuclear market did not, and would not, exist of its own accord. Government support is known as rationalization.[19] Second, firms lack incentives to internalize harmful externalities,[20] at least in the short run. Utility *A*, according to theory, has little or no incentive to increase the costs of safety improvements over utility *B*, or to expand public participation in decision making, if higher costs reduce its profits. Rationalization and the problem of harmful externalities are not unrelated. The government displacement of the market creates other imperfections and necessitates corrective actions. Rationalization creates direct and indirect subsidies that encourage entrants into the nu-

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17. A. ALCHIAN & W. ALLEN, EXCHANGE AND PRODUCTION: COMPETITION, COORDINATION, AND CONTROL 39-80 (1969).

18. *See generally* S. BREYER, REGULATION AND ITS REFORM 15-35 (1982) (examples of market failure including monopoly, inadequate information, spillovers, economic rents, excessive competition, unequal bargaining power, moral hazard, and scarcity).

19. *Id.* at 33. "Occasionally governmental intervention is justified on the ground that, without it, firms in an industry would remain too small or would lack sufficient organization to produce their product efficiently." *Id*; *see also* Duke Power Co. v. Carolina Envtl. Study Group, Inc., 438 U.S. 59 (1978). In its discussion of the constitutionality of the Price-Anderson Act, the Court found as a matter of law that the private nuclear industry would not exist without government support in the form of the enactment and implementation of the Price-Anderson Act. *Id.* at 77-78.

20. An externality can be defined as a cost (or benefit) that is not recognized in the unregulated price of a good or service. S. BREYER, *supra* note 18, at 23. With nuclear power, many safety problems, including the costs of lowering the probabilities of high risk events, are externalities. As such, they impose costs that, but for regulation, society would bear.

clear market. These entrants, in turn, necessitate safety regulations to force nuclear utilities to internalize their externalities.

The regulation of electric utilities is based on a third market failure. Historically, utilities were perceived as natural monopolies.[21] The economic sin of monopoly power is that a monopoly can reduce output, raise prices, and cause a loss of consumer surplus all at the same time.[22] Electric utilities are highly capital-intensive; a utility must invest three or four dollars in a plant to produce one dollar of revenue.[23] In any given service area, a utility must build a generating station or buy electricity, and then must transmit the electricity through power lines to users. If two utilities began competing in the same service area, the loser will have invested unnecessary capital because the additional plant and equipment will go unused, thus creating economic waste.[24] One way to avoid duplication—waste—of fixed capital assets—plant and equipment—is to limit entry to a single provider by conferring monopoly status on a utility. Encouraging only one optimum-size producer in a market is considered highly desirable under these circumstances.[25] Although it may seem counterintuitive, governments historically have fought the harms attributed to natural monopolies by allowing state-protected monopolies. Instead of promoting competition in the electric industry, the state simply conferred monopoly status on a firm, thus precluding new entrants. This monopoly-granting strategy prevented short-term waste at the expense of long-term competition.

In addition to waste avoidance, states conferred monopoly status on utilities in the belief that a high fixed-cost, capital-intensive industry enjoyed economies of scale. As firms expand production, by

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21. For a discussion of natural monopolies, see K. HOWE & E. RASMUSSEN, PUBLIC UTILITY ECONOMICS AND FINANCE 19 (1982); 1 A. KAHN, THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS 11-12 (1970). The existence of a "natural monopoly" in the electricity industry is not accepted by all economists. *See, e.g.*, Collins, *Electric Utility Rate Regulation: Curing Economic Shortcomings Through Competition*, 19 TULSA L.J. 141 (1983).

22. S. BREYER, *supra* note 18, at 15-16.

23. L. HYMAN, AMERICA'S ELECTRIC UTILITIES: PAST, PRESENT AND FUTURE 199-200 (2d ed. 1985); *see also* PRINCIPLES FOR ELECTRIC POWER POLICY, *supra* note 12, at ch. V.

24. *Contra* W. PRIMEAUX, DIRECT ELECTRIC UTILITY COMPETITION ch. 4 (1986) (no evidence of waste in a duopoly market).

25. C. PHILLIPS, THE REGULATION OF PUBLIC UTILITIES 41 (1984).

building more plants, the cost per unit of output decreases.[26] Another cost reductive measure is technological improvement. As plant designs became more sophisticated and efficient, production costs decreased. Nuclear technology, for example, promised significant savings in the cost of fuel. Even though a nuclear plant is more costly to build than other plants, fuel savings promised to offset construction costs.[27]

Nuclear utilities were therefore attractive to legislatures because the utilities promised reduced costs through economies of scale and technological improvements. In addition, courts and administrative agencies believed that the production of electricity was in the public interest and that government regulation could assure its delivery at the lowest cost.[28] The importance of the public interest rationale for utility regulation must be underscored. Utility regulation is at least as political as it is economic.[29] Talking about utility regulation in economic terms alone is impossible. Viewing electricity as a socially desirable commodity is the political justification for government economic regulation; the natural monopoly rationale is the economic justification for the exercise of political power.

As a result, several supply characteristics for electricity—and nuclear power—production can be identified: high fixed costs, long-run economies of scale, and technological improvements. Combined with an expanding economy and a belief in a direct GNP-energy link,[30] these characteristics have the effect of lowering the per unit price of a kilowatt of electricity. Simply put, the larger the utility, the lower its production costs and the cheaper its product. Large central power stations with monopoly protection per-

26. *See generally* Starr & Yu, *The Role of Centralized Energy in National Energy Systems*, in THE ECONOMICS OF NUCLEAR ENERGY 30 (L. Brookes & H. Motamen eds. 1984) [hereinafter BROOKES & MOTAMEN] (economies of scale in electric industry).

27. *See, e.g.*, REPORT OF THE NUCLEAR ENERGY POLICY STUDY GROUP, NUCLEAR POWER ISSUES AND CHOICES 109-22 (1977).

28. Drobak, *From Turnpike to Nuclear Power: The Constitutional Limits On Utility Rate Regulation* 65, 65-67 B.U.L. REV. 65 (1985); C. PHILLIPS, *supra* note 25, at ch. 1.

29. 1 A. KAHN, *supra* note 21, at 14-15.

30. *See* Schurr, *Energy, Economic Growth and Human Welfare*, in BROOKES & MOTAMEN, *supra* note 26, at 362 (Increasing energy production increases GNP and arguably raises human welfare.). *Contra* A. LOVINS, SOFT ENERGY PATHS: TOWARDS A DURABLE PEACE 7-11 (1977) (arguing that no necessary direct ratio exists between energy growth and growth in GNP).

formed well into the mid-1960s as electricity costs declined.[31] These supply characteristics, together with multiple oil price escalations in the 1970s and the country's desire for energy independence, made nuclear power attractive into the middle of the last decade.

The market for electricity also has peculiar demand characteristics that once favored nuclear-generated electricity. Some customer classes find substituting other resources as the price of electricity increases difficult. Because these consumers pay more for less or the same amount of product, electric prices are relatively inelastic.[32] For example, when the price of electricity increases 100%, and the demand declines only ten percent, the relationship is inelastic. The general wisdom is that the price elasticity of demand for electricity is relatively inelastic with some signs of improving long-run elasticity.[33] As utility prices rise, consumers will slowly put their money to other uses. Consumers will use less electricity, satisfy their electricity needs from other sources by investing in more energy-efficient appliances, acquire electricity from alternative producers, or invest in conservation devices such as insulation.[34]

Price inelasticity has serious distributional consequences. First, if the demand for electricity is inelastic, then, as prices increase, a greater transfer of wealth from consumers to producers results because some consumers have greater difficulty changing to alternative sources of electricity than others. Second, as prices rise, consumers who can move off-line will do so, leaving more costs to be

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31. *See generally* L. HYMAN, *supra* note 23, at 89-116 (discussing the history of public utilities from 1945-1965).

32. K. HOWE & E. RASMUSSEN, *supra* note 21, at 20 ("Empirical studies indicate that price elasticity of demand for utility services is relatively inelastic.").

33. P. JOSKOW & R. SCHMALENSEE, *supra* note 13, at 156 ("Numerous studies of the demand for electricity indicate that the short-run elasticity of demand at current [1983] prices is much less than 1 and that long-run price elasticity is around 1.").

34. Conservation, whether defined as a reduction in demand or an increase in energy efficiency, can be treated as a resource. *See* D. ROE, DYNAMOS AND VIRGINS (1984) (concerning the Environmental Defense Fund's litigation to force utilities, specifically Pacific Gas & Electric, to invest in conservation measures). For discussions on conservation, see Crandell, Elgas, & Kushler, *Making Residential Conservation Service Work: A Trilogy of Perspectives*, PUB. UTIL. FORT., Jan 10. 1985, at 28; Norland & Wolf, *Utility Conservation Programs: A Regulatory and Design Framework*, PUB. UTIL. FORT. July 25, 1985, at 15.

spread among fewer remaining captive customers. Managing cross-subsidization and distribution issues also justifies regulation.

Because consumers demand that electricity be readily available, and because electricity is virtually unstorable, generating capacity must meet demand. Utilities build two types of generating facilities: base load and peak load plants. Base load plants, which include all nuclear plants, run continuously. Peak load plants serve when demand surges, such as on the hottest day of the year. In order to meet their service obligation, utilities must be prepared to satisfy peak demand. Electricity supply and consumption forecasting worked together so well into the 1970s that peak demands were almost always satisfied and the concept of "excess capacity" was rarely mentioned. Today, however, that concept and its cause must be understood. Utilities have available for their customers a "reserve margin" of electricity, an amount of electricity roughly twenty percent above estimated peak. "Excess capacity" is defined as the amount of capacity above the "reserve margin."[35] Total capacity has been calculated as high as fifty-seven percent over peak[36] and now runs at about thirty-four percent,[37] which means excess capacities of thirty-seven percent and fourteen percent respectively.

Steadily increasing demand, coupled with the industry's economies of scale and a regulatory system that promotes capital expansion, produced a sufficient number of electrical plants. Unfortunately, when costs and prices turned upward and demand declined accordingly, the country found itself with too many plants. The rising-costs market for electricity occurred at the worst possible time for nuclear power. Because of lead times of about ten to twelve years,[38] nuclear investments made at the tail end of the declining-costs market and in the beginning of the rising-costs mar-

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35. *See* A. Kaufman, K. Kelly, R. Hemphill, The National Regulatory Research Institute, Commission Treatment of Overcapacity in the Electric Power Industry (1984); Principles for Electric Power Policy, *supra* note 12, at 124; Colton, *Excess Capacity: A Case Study in Ratemaking Theory and Application*, 20 Tulsa L.J. 402 (1985); Colton, *Excess Capacity: Who Gets the Charge from the Power Plant?*, 34 Hastings L.J. 1133 (1983); Dialogue, *Excess Capacity*, 35 Hastings L.J. 721 (1984).

36. A. Kaufman, K. Kelly & R. Hemphill, *supra* note 35, at 7.

37. Congressional Budget Office, Financial Condition of the U.S. Electric Utility Industry xiii (1986) [hereinafter CBO Study].

38. *Id.* at 10-11.

ket in the late 1960s and early 1970s were made in unnecessary plants.

The supply and demand characteristics discussed above describe the traditional market for electricity. Until the mid-1960s, electric utilities enjoyed a declining-costs market, economies of scale, technological improvements, and predictable linear growth. Government regulation encouraged this market by creating state-protected monopolies that rewarded capital expansion.[39] Electric utilities then would invest capital, build more plants, generate more electricity at lower unit costs, and expand national economic productivity, which in turn stimulated utilities to invest more capital, thus starting the cycle over again. Naturally, this expansionist scenario could not go on indefinitely. Starting in the late 1960s, the economic structure of the utilities industry began to change. Conditions no longer supported a monopoly model.[40] Instead, the market for electricity became more competitive.[41]

Today, as the real price of electricity rises, utilities must compete against substitute suppliers. Competition in the electric industry comes in the form of conservation and alternative sources. Large industrial consumers can satisfy demand from co-generation,[42] self-generation, or bargaining for lower prices. Smaller residential and commercial users can insulate or invest in alternatives such as solar power. Competition pressures utilities to set prices that are market sensitive.[43] The way to reconcile the existence and

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39. For the ramifications of this regulation, see *supra* note 10 and accompanying text; *infra* note 109 and accompanying text.

40. *See generally* Miller, *Strategies for an Electric Utility Industry in Transition*, PUB. UTIL. FORT., June 13, 1985, at 27 (author's analysis of industry life cycles shows that electric utilities have matured and their costs are increasing).

41. *See* Canto & Kadlec, *The Shape of Energy Markets to Come*, PUB. UTIL. FORT., Jan. 9, 1986, at 21, 23; Ferguson, *Is Central Station Generation Becoming a White Elephant?*, PUB. UTIL. FORT. Mar. 21, 1985, at 32, 32; Phillips, *The Changing Structure of the Public Utility Sector*, PUB. UTIL. FORT., Jan. 9, 1986, at 13, 16-19.

42. Zimmer & Jones, *Cogeneration: Boon or Bane to Consumers?*, PUB. UTIL. FORT., June 12, 1986, at 23, 23 (asserting that competition from cogeneration promotes efficiency by eliminating the cross-subsidization effects of current electric policy and by basing electricity prices on market value); *see also* Richards, *Power Users Seek Relief from Nuclear Costs: Big Customers May Switch Supplies or Generate Their Own*, Wall St. J., Sept. 12, 1985, at 6, col. 1; Richards, *Cogenerated Power Irritates Utilities: Growth Could Hasten Industry's Deregulation*, Wall St. J., Oct. 23, 1985, at 6, col. 1.

43. *See infra* note 120 and accompanying text.

history of large central power stations with emerging competition is to abandon allegiance to the traditional model of utility regulation and substitute a more competitive scheme. In this way, the mix of suppliers will be controlled by a regulatory scheme that is coordinated with contemporary market conditions.[44]

C. Financial Indicators

The traditional economic assumptions protecting the monopoly status of electric utilities, thus encouraging the large scale production of electricity—including nuclear generated electricity—recently have confronted a more competitive market. Not only do utilities compete for customers, they must also compete for capital investment. Once utilities were seen as safe investments and were part of any well-managed portfolio.[45] Today, investors cannot be so sanguine about putting money in utility stocks and bonds without differentiating between nuclear and non-nuclear utilities.[46]

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44. *See infra* text accompanying notes 104-26.

45. *See, e.g.*, B. GRAHAM, D. DODD & S. COTTLE, SECURITY ANALYSIS: PRINCIPLES AND TECHNIQUE 570-84 (4th ed. 1962).

46. This Article designates 29 electric utilities as "nuclear" utilities. These utilities are so designated because they have nuclear generation plants currently under construction; they have recently completed construction of nuclear plants; or they have recently cancelled, abandoned, or converted construction of nuclear plants. The utilities included in the sample are:

Arizona Public Service (AZP Group)
Central Hudson Gas and Electric
Central Maine
Cincinnati Gas and Electric
Cleveland Electric
Columbus and Southern Ohio Electric
Commonwealth Edison
Consumers Power
Dayton Power and Light
Detroit Edison
Duquesne Light
Georgia Power
Gulf States Utilities
Illinois Power
Kansas City Power and Light
Kansas Gas and Electric
Long Island Lighting
Middle South Utilities

Prior to the 1970s, the financial condition of the United States electric industry enabled utilities simultaneously to provide low-cost electricity to consumers and to earn a fair return on investment for their stockholders.[47] The industry was able to satisfy both consumers and stockholders by taking advantage of economies of scale resulting from increasingly large generation plants and more efficient methods of transmitting and distributing electricity.[48] Numerous factors began to threaten the financial stability of the utility industry in the 1970s, however. First, the declining-costs market reversed as utility costs rose.[49] Second, new technology did not result in further cost reductions.[50] Third, fuel costs rose sharply after the Arab oil embargo and the high inflation of 1973-74.[51] Fourth, growth in electricity demand, which from 1930-70 had av-

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New York State Electric and Gas
Niagara Mohawk Power
Northeast Utilities
Ohio Edison
Philadelphia Electric
Public Service of Indiana
Public Service of New Hampshire
Texas Utilities
Toledo Edison
Union Electric
United Illuminating

This sample of nuclear utilities was compiled by combining those utilities listed in the CBO STUDY, *supra* note 37, at 20, and Simpson & McCoy, *Nuclear Utilities' Money Raising is Disrupted by Industry Problems*, Wall St. J., Feb. 14, 1984, at 33, col. 4. All other utilities are designated as "non-nuclear" utilities.

See also ENERGY INFORMATION ADMIN., U.S. DEP'T OF ENERGY INVESTOR PERCEPTIONS OF NUCLEAR POWER 71 (1984) [hereinafter EIA STUDY]. In this study, a sample of 94 electric utilities was divided into two subsamples, nuclear and non-nuclear. The nuclear subsample was defined as containing those utilities that were either sole or joint owners of at least one nuclear power plant (operating or under construction). Also included in this subsample were subsidiaries of parent companies that owned nuclear plants. Out of the 94 utilities in the sample, 56 were designated nuclear and 38 were designated non-nuclear. This definition of "nuclear" utilities is much broader than the one that this Article has adopted.

47. CBO STUDY, *supra* note 37, at 5.

48. L. HYMAN, *supra* note 23, at 117; *see also* EDISON ELECTRIC INSTITUTE, EEI TASKFORCE ON NUCLEAR POWER, REPORT OF THE EDISON ELECTRIC INSTITUTE ON NUCLEAR POWER 1 (1985) [hereinafter EEI REPORT].

49. UNITED STATES GENERAL ACCOUNTING OFFICE, ANALYSIS OF THE FINANCIAL HEALTH OF THE ELECTRIC UTILITY INDUSTRY 10 (1984) [hereinafter GAO STUDY]; *see also* L. HYMAN, *supra* note 23, at 117; EEI REPORT, *supra* note 48, at 2.

50. L. HYMAN, *supra* note 23, at 117.

51. CBO STUDY, *supra* note 37, at 8; GAO STUDY, *supra* note 49, at 11.

eraged an annual rate of 7%, slackened to 2.5% annually for the period of 1970-83.[52] Fifth, following TMI, regulatory requirements increased.[53] Finally, construction costs for new generating plants, particularly for nuclear plants, rose as a result of construction delays, high interest rates, new safety regulations, social and environmental concerns, and demand uncertainties.[54] The entire industry faced a period of economic turmoil marked by declining profitability, lowered bond ratings, and falling stock prices.[55]

Today, electric utilities have escaped the financial morass of the 1970s and are in better financial condition than at any time in recent years,[56] partially because of the kindness of regulators. Still, the financial palpitations felt by the industry signal congenital health problems. Nuclear utilities have faced peculiar financing difficulties.[57] The Congressional Budget Office recently published a study identifying fifteen of the 100 largest investor-owned electric utilities as experiencing cash flow shortages precisely because of their nuclear construction programs.[58] While construction costs have increased for all electric generation plants, they have risen most rapidly for nuclear plants. The cost of constructing a typical nuclear plant rose from about $715 per kilowatt in the period 1971-74 to about $1,389 in the period 1981-84. The Congressional Budget Office projects that the cost of a nuclear plant entering operation in 1985 or 1986 has almost doubled to $2,600 per kilowatt.[59] The financial strains of nuclear construction caused by

52. CBO STUDY, *supra* note 37, at 9; *cf.* GAO STUDY, *supra* note 49, at 11 (annual growth rate for period 1970-81 was 2.1% compared with previous 25-year average of 7.2%).

53. CBO STUDY, *supra* note 37, at 10.

54. *See* CBO STUDY, *supra* note 37, at 8; GAO STUDY, *supra* note 49, at 11.

55. L. HYMAN, *supra* note 23, at 118.

56. CBO STUDY, *supra* note 37, at xi; GAO STUDY, *supra* note 49, at 10. Indeed, several electric utilities have a problem with too much cash. *See* Hall, *Cash Surplus: Strategies for Dealing With the Problem of Plenty*, PUB. UTIL. FORT., Apr. 3, 1986, at 18; Rose, *Utilities Flush With Cash Enter New Fields*, Wall St. J., July 1, 1986, at 6, col. 1.

57. CBO STUDY, *supra* note 37, at 2.

58. *Id.* at 19-20 (table listing utility and name of construction project) (note that three utilities, Consumers Power, Dayton Power and Light, and Public Service of Indiana, have recently abandoned, deferred, or converted their projects); *see also* PUBLIC UTILITIES REPORTS, INC., THE P.U.R. ANALYSIS OF INVESTOR-OWNED ELECTRIC AND GAS UTILITIES 1985 Edition *passim* (1985) (data on each of the 15 utilities shows that construction projects are nuclear projects) [hereinafter P.U.R. ANALYSIS].

59. CBO STUDY, *supra* note 37, at 10-11. Estimating construction costs for nuclear plants is not an exact science because of the many variables that can affect cost. Differences in

heavy borrowing,[60] together with the structural reversal of the market, have caused utilities to cancel nuclear projects. Between 1974 and 1984, ninety-seven nuclear plants were cancelled.[61] It is estimated that the costs for these cancelled plants are between $10 billion and $100 billion, thus threatening the financial health of the industry.[62]

The financial heath of the electric utility industry is best measured in the capital market, which indicates a firm's ability to raise money. A utility's ability to attract capital can be gauged through

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design and location of plants, treatment of authorized funding used during construction, construction of single versus multiple units, assignment of costs among multiple units, and interest charges and construction delays can all lead to cost variances among plants. OFFICE OF COAL, NUCLEAR, ELECTRIC, AND ALTERNATE FUELS, U.S. DEP'T OF ENERGY, SURVEY OF NUCLEAR PLANT CONSTRUCTION COSTS 15 (1984); *see also* ENERGY INFORMATION ADMIN., U.S. DEP'T OF ENERGY, AN ANALYSIS OF NUCLEAR POWER PLANT CONSTRUCTION COSTS ch. 3 (1986) (additional factors affecting construction costs are size of unit, whether plant uses cooling towers, start date of construction, experience of contractor, and whether utility is construction manager). Because of these factors, estimates of nuclear construction costs vary widely. *See, e.g., id.* at ix (inflation-adjusted cost for plants that entered construction in 1966-67 was $700 per kilowatt compared with $3,100 per kilowatt for plants that entered construction in 1974-75); OFFICE OF COAL, NUCLEAR, ELECTRIC, AND ALTERNATE FUELS, *supra*, at 15 (average cost per kilowatt of capacity increased from $313 in period 1971-74 to $1,229 in period 1981-84); C. Komanoff, Assessing the High Costs of New U.S. Nuclear Power Plants (June 1984) (copy on file with authors) (average construction cost per kilowatt in 1982 dollars was $2,100 (excluding AFUDC) for nuclear plants, compared to $800-$900 per kilowatt for coal plants); Perl, Estimated Costs of Coal and Nuclear Plant Generation table 2 (Dec. 12, 1978) (paper on file with authors) (average construction costs for 1200 megawatt plant in 1990 dollars is $2,195.35 per kilowatt for nuclear, compared to $1,566.12 per kilowatt for coal); Itteilag & Pavle, *Nuclear Plants' Anticipated Costs and Their Impact on Future Electric Rates*, PUB. UTIL. FORT., Mar. 21, 1985, at 35, 37 (The average estimated cost per kilowatt of installed capacity in 1984 was $2,400 compared to $135 per kilowatt in 1970 and $630 per kilowatt in 1980.).

60. *See* GAO STUDY, *supra* note 49, at 19; *see also* Simpson and McCoy, *Nuclear Utilities' Money Raising is Disrupted by Industry Problems*, Wall St. J., Feb. 14, 1984, at 33, col. 4.

61. CBO STUDY, *supra* note 37, at 11.

62. The Department of Energy estimates abandonment costs at $8.1 billion in its worse-case study. NUCLEAR PLANT CANCELLATIONS, *supra* note 14, at xxi, table ES4. The estimate is low even in a worst case because plants costing more than $8.1 billion were cancelled after the report. Economist Charles Komanoff estimates that the national economic damage caused by nuclear abandonment is $65 billion to $100 billion. The figure includes $15 billion invested in cancelled plants, $20 billion to $40 billion invested in plants likely to be cancelled, and $30 billion to $40 billion attributable to plants with large cost overruns. C. Komanoff, *supra* note 59; *see also* C. FLAVIN, NUCLEAR POWER: THE MARKET TEST 33-42 (1983); Hertsgaard, *Nuclear Power: Too Costly to Save*, N.Y. Times, June 24, 1984, at F3, col. 1.

an examination of financial indicators. Although the industry, financial institutions, and public commissions[63] use several financial indicators, this Article discusses three common ones: rate of return on common equity; ratio of market price to book value of common stock; and corporate bond ratings.[64]

The rate of return on common equity measures the return of common stockholders. A firm pays stockholders through retained earnings.[65] The rate of return on common equity provides a measure of how well a utility has done with its stockholders' investment dollars.[66] Firms, however, pay return on equity only after other debt obligations, including bond obligations, have been paid. If revenues are insufficient to cover debt interest, firms can reduce or eliminate dividends. Several nuclear utilities have done so. Long Island Lighting Company, for example, has omitted a quarterly dividend on its common stock since March 1984.[67]

The return on equity received by stockholders should be commensurate with the risk of their investment. A stockholder will be satisfied with a lower return for a lower risk; conversely, a stockholder will demand a higher return for a riskier investment.[68] The Energy Information Administration of the Department of Energy has found that stockholders have perceived investment in nuclear utilities to be riskier than investment in non-nuclear utilities. Con-

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63. GAO STUDY, *supra* note 49, at ii.

64. *Id.* The GAO Study also lists 14 other financial indicators: interest coverage; debt to equity; internal generation of funds; load factor; dividend as a percentage of book value; return on net plant; allowance for funds used as a percentage of income; effective tax rate; price earnings ratio; capital expenditures as a percentage of total capital; construction work-in-progress as a percentage of net plant in service; capital employed per kilowatt hour; production cost per kilowatt hour; and dividend payout. *Id.* at 32.

65. *See* CBO STUDY, *supra* note 37, at 25.

66. GAO STUDY, *supra* note 49, at 7.

67. *See* CBO STUDY, *supra* note 37, at 25-26. Other dividend omissions and reductions include:

Central Maine omitted since 4/85
Consumers Power omitted since 10/84
General Public Utilities omitted since 11/26/79
Middle South Utilities omitted since 3d quarter 1985
Public Service of New Hampshire omitted since 4/19/84
Public Service of Indiana reduced 65% since 2/84
United Illuminating reduced 38% since 7/84

Id. at 26, table 4.

68. *See* L. HYMAN, *supra* note 23, at 257.

sequently, the return on the average nuclear utility rose one to two percentage points higher than the return on the average non-nuclear stock.[69] This differential is the risk premium necessary to induce stockholders to invest in nuclear power. Consistent with these findings, the industry as a whole averaged a return on equity of 12.49% during 1980-82,[70] while a number of nuclear utilities averaged returns of above 13.5% for this same period.[71]

The market-price-to-book-value ratio of a firm compares the market price of its common stock with the stock's book value. Book value is common equity divided by the number of shares of common stock outstanding.[72] This ratio is helpful in assessing the financial community's perception of the strength of a utility's future rate of return. If return on common equity is expected to be comparable to the returns available on alternative investments, the market price of the utility's common stock will be close to its book value. This results in a market-price-to-book-value ratio of approximately one. If the financial community expects the utility's future rate of return to be less strong than that of alternative investments, however, the market price of its common stock will be below its book value, resulting in a market-to-book ratio below one.[73]

69. EIA STUDY, *supra* note 46, at x-xi.

70. Figures for return on common equity were compiled and averaged from the *Annual Reports on American Industry, Electric Utilities*, FORBES, Jan. 5, 1981, at 217; *Annual Reports on American Industry, Electric Utilities*, FORBES, Jan. 4, 1982, at 104; *Annual Report on American Industry, Electric Utilities*, FORBES, Jan. 3, 1983, at 103.

71. For example:

Texas Utilities 15.7%
Public Service of Indiana 15.23%
Arizona Public Service (AZP Group) 14%
New York State Electric and Gas 13.87%
Gulf State Utilities 13.63%
Illinois Power 13.57%
Long Island Lighting 13.57%

Figures compiled and averaged from *Annual Reports on American Industry, Electric Utilities*, FORBES, Jan. 5, 1981, at 217; *Annual Reports on American Industry, Electric Utilities*, FORBES, Jan. 4, 1982, at 104; *Annual Reports on American Industry, Electric Utilities*, FORBES, Jan. 3, 1983, at 103. While these utilities have shown high rates of return, some non-nuclear utilities have experienced high returns also (e.g., the average return on equity for Southwestern Public Service for 1980-82 was 18.03%). *Id.*

72. GAO STUDY, *supra* note 49, at 71; *see also* B. GRAHAM, P. DODD, S. COTTLE, *supra* note 45, at 596-99.

73. GAO STUDY, *supra* note 49, at 7-8.

The condition resulting from a market-to-book ratio below one is known as stock dilution.[74]

Reflecting the poor financial condition of the utility industry in the 1970s, the market-price-to-book-value ratios of both nuclear and non-nuclear utilities indicated stock dilution.[75] Electric utility stocks closed at prices below book value in each of the years 1973-80.[76] Nuclear utility stocks have experienced a more prolonged period of dilution than have non-nuclear utility stocks, however. For example, during the post-TMI years 1979-81, nuclear utilities showed an average market-to-book ratio of .736, while that of non-nuclear utilities was a close .737. During the years 1982-84, however, the market-price-to-book-value of non-nuclear utility stocks rose to an average of .956. During this same period, the market-to-book ratio of nuclear utility stocks also rose, but only to an average of .812.[77] From 1975 through 1984, only six nuclear utilities out of a sample of twenty-five showed a market-to-book ratio of above one in at least one of the ten years; in contrast, twenty-five of forty-two non-nuclear utilities showed a ratio of above one in at least one of those years.[78] In the last five years, the market-price-to-book-value ratio for most utilities has improved with the electric industry in general; the average market-to-book ratio for the industry rose to 1.1 in June 1985.[79] The market-to-book ratios for nuclear utilities continue to indicate stock dilution, however.[80]

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74. *Cf.* L. HYMAN, *supra* note 23, at 5, 251 (discussing the diluting effect of a low market-to-book ratio on stock).

75. *Id.* at 107.

76. *Id.* at 262.

77. Figures compiled from MOODY'S INVESTORS SERVICE, MOODY'S HANDBOOK OF COMMON STOCKS (Spring ed. 1986). Market-price-to-book-value ratios for individual electric utilities were calculated by dividing both the high and low market price of stock for each year by the year's book value. This Article designates the average of the resulting high and low market-to-book ratio for each year as the market-price-to-book-value ratio. The ratios for the nuclear utilities were derived from the average ratios for 25 utilities; the ratios for the non-nuclear utilities were derived from the average ratios for 42 utilities.

78. Data compiled from MOODY'S INVESTORS SERVICE, MOODY'S HANDBOOK OF COMMON STOCKS (Spring ed. 1986 & Spring ed. 1982). Each of the six nuclear utilities that experienced a market-to-book ratio of more than one did so between 1975 and 1977; from 1977 through 1984, none of the sample of nuclear utilities showed a ratio of more than one. *Id.*

79. CBO STUDY, *supra* note 37, at 18.

80. In 1984, the most recent year for which data was available, the average market-price-to-book-value ratio for the sample of 25 nuclear utilities was .735; by comparison, that of the sample of 42 non-nuclear utilities was 1.003. *See also* CBO STUDY *supra* note 37, at 19.

Corporate bond ratings focus on the creditworthiness of a firm, indicating the firm's ability to attract debt-financed capital and its ability to repay creditors. This rating provides a way of measuring a lender's perception of a firm's long-term financial prospects.[81] Independent rating agencies issue bond ratings.[82] The two largest agencies, Moody's and Standard and Poor's, rate a firm's bond issues according to letter guides. Ratings of Aaa, from Moody's, or AAA, from Standard and Poor's, are the highest, indicating the best quality bonds with extremely strong ability to repay debt. From these highs, ratings decline to Aa, A, Baa, Ba, and B from Moody's and AA, A, BBB, BB, and B from Standard and Poor's. Generally, the financial market considers bonds rated below Baa or BBB not of investment quality.[83]

Nuclear utility bond ratings are lower than those of non-nuclear utilities. In 1970, ninety-six percent of the utilities with nuclear construction that were rated by Standard and Poor's received a bond rating of A or above.[84] Such high ratings indicated that the long-term financial health of nuclear utilities was expected to be strong, meaning that debt readily could be repaid. Over the next decade, however, the financial health of nuclear utilities deteriorated. By 1980, only sixty-seven percent of utilities with nuclear construction had even investment-grade ratings.[85] Indeed, by the early 1980s, the ratings of some utilities had fallen so low that laws prohibited many institutional investors from buying their bonds due to their speculative nature.[86] By contrast, bond ratings for utilities without nuclear construction generally remained good during the 1970s and into the 1980s. The mean bond rating for non-nuclear utilities remained within the Aa to A range, while, by 1983, the mean bond rating for nuclear utilities had fallen to BBB.[87] Using Moody's ratings for the period 1983-85, non-nuclear and nu-

81. GAO STUDY, *supra* note 49, at 8-9.

82. *See id.* at 8.

83. L. HYMAN, *supra* note 23, at 254-55.

84. CBO STUDY, *supra* note 37, at 15; *see also* GAO STUDY, *supra* note 49, at 10.

85. CBO STUDY, *supra* note 37, at 15.

86. *Id.*; *see also* L. HYMAN, *supra* note 23, at 255.

87. CBO STUDY, *supra* note 37, at 15.

clear utility bonds maintained comparable average ratings of Aa to A and Baa, respectively.[88]

Because a utility's bond rating reflects its ability to attract debt-financed capital and its ability to repay creditors, the depressed bond ratings of nuclear utilities indicate that they have trouble attracting new debt capital. Low bond ratings therefore reflect the difficulties that nuclear utilities have in resolving their cash-flow problems and gaining a stronger financial position.

Many nuclear utilities now carry larger debts than ever before, debts greatly in excess of the types of debt carried by non-nuclear firms.[89] To the extent that a jurisdiction forbids "construction work in progress" to be included in the rate base, thus preventing costs from being passed through to consumers, a utility cannot earn a return on plant that has not been placed into service. Because of construction delays and lengthy lead times,[90] nuclear utilities suffer when they cannot earn a return on nonproductive assets. The costs of nuclear construction are such that they absorb a major portion of a firm's assets. Philadelphia Electric Company, for example, has assets of $8.1 billion, is capitalized at $7.57 billion, and has $3.4 billion tied up with the construction of Limerick

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88. Ratings compiled from MOODY'S INVESTORS SERVICE, MOODY'S PUBLIC UTILITY MANUAL (vols. 1983, 1984 & 1985). This Article derived the average bond rating for a sample of 25 nuclear utilities and 43 non-nuclear utilities by assigning each rating from Aaa to B a numerical value:

Aaa = 6
Aa = 5
A = 4
Baa = 3
Ba = 2
B = 1

The average numerical value for the nuclear sample was 2.99, indicating a bond rating of Baa. The average numerical value for the non-nuclear sample was 4.57, indicating a bond rating between A and Aa. Since May 3, 1982, Moody's has used numerical modifiers to indicate gradation within a rating (e.g., Baa2). These numerical modifiers were not figured into the averages.

89. In 1984, the average ratio of debt (preferred stock and long-term debt) to assets (net utility plant) for the sample of 29 nuclear utilities was 59.7%, while the average ratio of debt to assets for the sample of 42 non-nuclear utilities was 51.9%. Figures compiled from P.U.R. ANALYSIS, *supra* note 58. The ratio of debt to equity for individual utilities was calculated by adding the dollar amounts of preferred stock and long-term debt and dividing the total by net utility plant. These results were then averaged to arrive at the average ratio of debt to assets for each sample.

90. CBO STUDY, *supra* note 37, at 10-11.

Units 1 and 2.[91] Carrying large amounts of debt for long periods of time means that interest charges can approach principal[92] and can cost millions of dollars per month,[93] thus putting a further financial strain on utilities.

Utility financing also experienced the unevenness of the transition. Market changes and changes in utilities' financial requirements increased their financial risk. Traditionally, the capital structure of utilities was highly leveraged: utilities were financed with more debt than equity.[94] Almost two-thirds of the money raised by utilities comes from bonds and preferred stock.[95] High leveraging makes sense with the traditional market structure over a substantial range of investment. Utilities preferred debt financing because they could borrow large sums and keep the firm's overall rate of return fairly low because bonds are a less risky investment than common stock. High leveraging also increases the attractiveness of common stock. Because a smaller percentage of common stock is issued, its return is raised.[96]

Leveraging works less well in today's climate of increasing costs. High leveraging means larger fixed costs and lower interest coverage, thus increasing the risk of bankruptcy. If a utility becomes too heavily leveraged, it will not earn enough revenue to pay its debt. The utility must then try to raise money through equity financing. In order to restructure financing from debt to equity during a delicate financial period, the return on equity must be raised to attract capital, again raising the cost of money. When internal sources of capital are exhausted and debt charges absorb income, however, the value of new common stock is diluted,[97] thus increasing financial risk.

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91. P.U.R. ANALYSIS, *supra* note 58, at 294-95.

92. EEI REPORT, *supra* note 48, at 34 (60% of principle with 13-year lead-time for construction).

93. For example, because of construction delays, the interest costs for Public Service Company of Indiana's Marble Hill Unit 1 increased by $45 million per month prior to its cancellation. ARTHUR D. LITTLE, INC., REPORT TO GOVERNOR'S TASK FORCE ON PUBLIC SERVICE COMPANY OF INDIANA 7 (Dec. 21, 1983), *reprinted in* GOVERNOR'S TASK FORCE REPORT ON PUBLIC SERVICE COMPANY OF INDIANA MARBLE HILL STATION (1984).

94. *See generally* K. HOWE & E. RASMUSSEN, *supra* note 21, at 255-62.

95. L. HYMAN, *supra* note 23, at 201.

96. K. HOWE & E. RASMUSSEN, *supra* note 21, at 260-61.

97. L. HYMAN, *supra* note 23, at 251.

These financial indicators all point in one direction. The cost of obtaining money for nuclear utilities during the transition was higher than the cost of obtaining money for non-nuclear utilities. Utilities can attempt to satisfy their demand for capital internally through depreciation, deferred taxes or retained earnings, or externally through borrowing or through issuing stock or bonds, but none of these avenues afford complete relief.[98] In addition, utilities can seek regulatory relief from their financial troubles.[99]

The need for nuclear financing caused a cash flow squeeze on utilities. The pressure for cash forced utilities to engage in creative accounting techniques through devices such as accelerated depreciation, normalization of taxes, and including "construction work in progress" in the rate base, all of which required regulatory approval. Accelerating the amount of depreciation a utility can take in a given year means that more money is available earlier for the utility.[100] Likewise, tax normalization adds to cash flow by treating accelerated depreciation as a deferment of taxes.[101] Finally, "construction work in progress" is an accounting entry which includes in the rate base money invested in an ongoing construction project, thus allowing a rate of return on money invested in construction even though no electricity is produced.[102] The express intent of each of these methods is to improve the cash flow position of utilities.

During the 1970s, electric, especially nuclear, utilities suffered declining earnings, lower bond ratings, stock dilution, and an increase in the ratio of non-productive to productive assets, thus triggering the need for cash flow accounting. In the 1980s, these trends began to reverse as plants were completed or taken off line and, more significantly, as managers and regulators responded to the cash flow needs of utilities. The transition period has made its

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98. CBO STUDY, *supra* note 37, at 23-42.

99. *Id.* at 26-30. Regulatory relief is a costly alternative because of its uncertainty. Some analysts argue that regulatory hostility has forced utility managers to reduce or eliminate capital spending. *See, e.g.*, P. NAVARRO, THE DIMMING OF AMERICA: THE REAL COSTS OF ELECTRIC UTILITY FAILURE 13-25 (1985). The reduction in prudent capital investment means that investors will look elsewhere for investment opportunities, thus reducing the capital available to utilities.

100. K. HOWE & E. RASMUSSEN, *supra* note 21, at 84-86.

101. *Id.* at 86-88.

102. *Id.* at 92.

presence known, however, by altering the way capital markets and utility managers assess the financial structure of utilities. For the foreseeable future, managers must accept the reality of greater financial risk.[103] Likewise, regulators must reassess the role of financial risk in the rate-making process. Transition in both the market for electricity and in the financing schemes of utilities signals change in the regulatory sector as well.

D. Nuclear Rate Making

Both government regulation and market competition, the public and private sides of utilities, find common ground in the rate-making process. Rate making is the central connection between the state and a utility's financial health. If the rate-making process is sound, the financial health of utilities will be sound as well. This soundness claim does not mean, however, that regulators must grant rate increases geared to the satisfaction of utilities.[104] Rather, sound rate making is based on efficient market mimicking and equitable political judgments.[105] Unfortunately, economic, political, and regulatory coordination is not currently the case. The contemporary regulatory scheme is based on nineteenth century market assumptions.[106] Unless the rate-making process is modified dramatically, electric utilities will continue to be subject to an anachronistic scheme of regulation.

The traditional political response to the problems of natural monopolies—lower output, higher prices, lost consumer surplus, and economic waste—was government regulation. The delicate problem was one of design: How can government regulation appear attrac-

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103. Although financial risk increases with increasing competition, investor-owned utility bankruptcy is unlikely because it is inherently inefficient. *See* Flaschen & Reilly, *Bankruptcy Analysis of a Financially-Troubled Electric Utility*, 22 HOUS. L. REV. 965 (1985). Public utilities commissions also have rejected bankruptcy as a viable alternative. *See, e.g.*, Consumers Power Co., 66 Pub. Util. Rep. 4th (PUR) 1 (Mich. PSC 1985); Public Serv. Co. of New Hampshire, 66 Pub. Util. Rep. 4th (PUR) 349 (N.H. PUC 1985).

104. Regulated firms have no constitutional right to financial integrity. *See* Market St. Ry. v. Railroad Comm'n, 324 U.S. 548, 566-69 (1945); Pennsylvania Elec. Co. v. Pennsylvania Pub. Util. Comm'n, 502 A.2d 130 (Pa. 1985), *appeal dismissed sub nom.* Metropolitan Edison Co. v. Pennsylvania Pub. Util. Comm'n, 106 S. Ct. 2239 (1986).

105. *See, e.g.*, 1 A. KAHN, *supra* note 21, at 1-19.

106. Allison, *Imprudent Power Construction Projects: The Malaise of Traditional Public Utility Policies*, 13 HOFSTRA L. REV. 507 (1985).

tive enough to encourage the private sector to invest money in a regulated industry? The answer was to design a regulatory scheme that gave a utility some of the economic benefits of a monopoly without imposing a monopoly's costs on society.

Governments based public utility regulation on a fundamental tradeoff. In exchange for exclusive jurisdiction over a specific geographic service area, a regulated utility had to do two things. First, the utility undertook a service obligation preventing the utility from moving its resources into more financially attractive investment opportunities whenever they came along. Instead, utilities had to invest in satisfaction of the service obligation.[107] The problem was that nothing prevented the utility from shutting down service and going out of business. Surely a "service obligation" cannot force someone to work without a financial incentive. This need for financial support implicates the second, and more important, obligation assumed by a utility: allowing the state to set its prices through rate making.[108] Admittedly, the idea of rate making by government rather than by market appears to be a disincentive. When examined closely, however, the rate-making formula clearly serves a special function. It encourages capital expansion by rewarding capital spending. When the market for electricity changed, this formula had the anomalous effect of aggravating a weakening financial situation, particularly for long lead-time nuclear projects.[109] Utilities had to borrow increasing amounts of money at

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107. *See, e.g.*, 1 A. PRIEST, PRINCIPLES OF PUBLIC UTILITY REGULATION 227-83 (1969).

108. C. PHILLIPS, *supra* note 25, at ch. 5.

109. *See generally* E. GELLHORN & R. PIERCE, REGULATED INDUSTRIES 88-92 (1987); C. PHILLIPS, *supra* note 25, at 156-61; J. TOMAIN, ENERGY LAW 104-35 (1981).

The classic rate-making formula can be stated as $R = O + r$, where:

R = revenue requirement
O = operating expenses
B = rate base
r = rate of return

The revenue requirement (R) is the total amount of money a utility is entitled to earn by law. In other words, R is the amount of money a utility can charge its customers. In order to make a profit, any firm must recover its costs. As a result, utilities can recover reasonably incurred operating expenses (O). In addition to these operating expenses, which basically cover the utility's variable costs, the utility is entitled to recover its fixed capital investments. This variable is known as the rate base (B). Not only does the utility recover its capital investment, it also earns a return on the investment (r). These two variables (B and r) drive the rate-making formula. They are the variables that make a regulated public utility most like a nonregulated competitive firm. A utility manager can earn a profit for the firm increasingly higher interest rates, thus raising the price of electricity and decreasing demand. As demand decreased, prices rose even further for more captive customers, thus decreasing demand even further. As rates increase, consumers use less electricity, necessitating higher prices and putting utilities into a financial "death spiral."[110] Simply put, the reward system, which works in a declining-costs, expanding-demand market, does not work for the nuclear market.

Traditional rate making has induced utilities to over-invest in what has turned out to be unnecessary and expensive nuclear plants. Nuclear utilities have made three sorts of mistaken investment. First, planners grossly underestimated construction costs, thus putting utilities into a cash squeeze.[111] Second, plants under construction were cancelled.[112] Third, completed plants contributed to excess capacity.[113] These mistaken investment decisions left billions of dollars in costs to be allocated. In response to the industry's financial predicament, regulators were asked to accommodate utilities with financial support.

The request for financial aid, or regulatory relief, was unprecedented because of both its magnitude and its peculiar circumstances. The size of requested rate increases either threatened to

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by realizing efficiency in production. Moreover, capital investment is encouraged because the return on investment increases with the amount invested. The tendency of the rate formula to encourge over-investment is the Averch-Johnson (A-J) effect. *See* Averch & Johnson, *supra* note 10, at 1065. The A-J effect appears to occur in the kind of declining-costs market described earlier. It most likely will not occur, or will be reversed, in a rising-costs market with the traditional formula. *See* P. NAVARRO, *supra* note 99, at 15-16.

110. Thompson, *New Driving Forces in the Electric Energy Marketplace—To a "Death Spiral" or Vigorous Competition?*, PUB. UTIL. FORT., June 21, 1984, at 31, 37-38.

111. Examples of three plants should suffice to demonstrate gross underestimation.

Cost Estimates	Zimmer	Marble Hill	Shoreham
Original Cost	$240 million	$1.4 billion	$265 million
Cost to Complete	$3.1 billion	$7 billion	$5 billion

J. TOMAIN, NUCLEAR POWER TRANSFORMATION 185 (1987); *see also* NUCLEAR PLANT CANCELLATIONS, *supra* note 14, at 17-24. When utility managers make imprudent investment decisions, the amount found to be spent imprudently is disallowed rate base treatment and shareholders, not ratepayers, absorb the loss. *See, e.g.*, Long Island Lighting Company - Phase II - Proceeding on Motion of Commission to Investigate Cost of Construction of Shoreham Nuclear Generating Facility, [State Current Decisions] Util. L. Rep. (CCH) ¶ 24,922 (N.Y. PSC Dec. 16, 1985).

112. *See supra* notes 14 and 62 and accompanying text.

113. CBO STUDY, *supra* note 37, at 1-4.

bankrupt utilities if denied, or to paralyze consumers by rate shock if granted.[114] Furthermore, the utilities' request for regulatory relief lacked a readily identifiable *quid pro quo*. With excess capacity additions and cancelled plants, ratepayers were asked to pay without receiving any electricity for their payments. In the case of imprudent investment, ratepayers were asked to subsidize utility managers' mistakes. The regulatory dilemma was between threatening the financial integrity of utilities or abandoning cost-of-service rate making. Not surprisingly, regulators "balanced" shareholder and ratepayer interests. Regulators based this balancing on political expediency, not economic theory, as detailed in Part III of this Article.

Basically, utilities ask for two types of regulatory relief: first, that plant cancellation costs and excess capacity addition costs be included in the rate base under the theory that the construction decisions were prudent when made;[115] and second, that their cash flow be improved primarily through inclusion of "construction work in progress" in the rate base, but also through helpful accounting practices such as tax normalization and accelerated depreciation. Consumers have two counterarguments. First, under the "used and useful" theory,[116] they should not pay for what they do not receive. Second, they should not pay for imprudent investment.

The consumers' side is problematic. If utilities are forced to absorb all losses, the utilities will be threatened with bankruptcy, and bankruptcy will raise the cost of electricity.[117] Furthermore, the incentive structure under the used and useful standard encourages utilities to continue to dump money into nuclear projects or into coal conversion in order to bring them on-line, and this threatens

114. *See* CBO STUDY, *supra* note 37, at xiii.

115. Gary & Roach, *The Proper Regulatory Treatment of Investment in Cancelled Utility Plants*, 13 HOFSTRA L. REV. 469 (1985); *see also* Dakin, *The Changing Nature of Public Utility Regulation: The Used and Useful Property Rate Base Versus the Capitalization Rate Base in the Nuclear Age*, 45 LA. L. REV. 1033 (1985).

116. Colton, *Excess Capacity: Who Gets the Charge from the Power Plant?*, *supra* note 35, at 1137-41.

117. Maine Pub. Serv. Co., 67 Pub. Util. Rep. 4th (PUR) 101, 119-20 (Me. PUC 1985); Consumers Power Co., 66 Pub. Util. Rep. 4th (PUR) 1, 20-21 (Mich. PSC 1985); Public Serv. Co., 66 Pub. Util. Rep. 4th (PUR) 349, 424-28 (N.H. PUC 1985).

rate shock.[118] Finally, if all construction work in progress is excluded from the rate base, when the plant is put on-line rates will be relatively higher to account for additional carrying costs.[119]

In light of the changes in the underlying premises for the traditional rate-making equation, such as changes in electricity demand and supply characteristics and in utility financing, the old regime is confronting a new world. Many people are questioning the traditional rate formula. Such questioning is endemic to a transitional period. Rate making based on a monopoly model simply does not work in a competitive environment. As the market becomes more competitive, rate making must, for efficiency and equity reasons, reflect the economic—market—value of a kilowatt, rather than a utility's internal historic costs.[120] By setting rates on a utility's avoided costs, the cost the utility would pay to purchase a unit of electricity in the market, society realizes both efficiency and equity in electricity pricing. First, the utility bears business and financial risks under this approach. If a new project costs more than the economic value of electricity, then shareholders must suffer. The avoided cost method thus gives utilities an incentive to produce electricity at or below market value, thereby rewarding their shareholders for efficiency gains. Second, the method avoids intergenerational equity problems by setting the price at current economic value. Third, market-based pricing eliminates unfair distributional issues such as cross-subsidization. Finally, a rate-making formula based on avoided costs privatizes risks and gains without social-

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118. *See* Olson, *Statutes Prohibiting Cost Recovery for Cancelled Nuclear Power Plants: Constitutional? Pro-Consumer?*, 28 J. URB. & CONTEMP. L. 345 (1985).

119. *See* Morin, *An Empirical Study of the Effect of CWIP on Cost of Capital and Revenue Requirements*, PUB. UTIL. FORT., July 10, 1986, at 21 (Part I), and July 24, 1986, at 24 (Part II).

120. *See, e.g.*, Wolf Creek Nuclear Generating Facility, Docket Nos. 120,924-U and 142,098-U (KG&E); 142,098-U (KCP&L); 142,099-U (KEPC) (Sept. 27, 1985); Kolbe, *How Can Regulated Rates and Companies Survive Competition?*, PUB. UTIL. FORT., Apr. 4, 1985, at 25; Kubitz, *The Energy Utilities: How to Increase Rewards to Match Increasing Risks*, in PROFIT AND THE PURSUIT OF ENERGY: MARKETS AND REGULATION (Aronson & Cowhey eds. 1983); Gottstein, Avoided Costs Ratemaking for Diablo Canyon, Application No. 84-06-014 (Sept. 10, 1985) (copy on file with authors); Prepared Testimony of Ron Knecht, California Public Utilities Commission, Order Instituting Investigation No. 85-05-001 Southern California Edison Company Respondent, Ratemaking for the Palo Verde Nuclear Project (June 17, 1985) (copy on file with authors).

izing any single utility's internal inefficiencies, such as mistaken or imprudent investment.[121]

During transition from traditional regulation to competition, that is, from monopoly status to competitive status, regulators will not step aside completely and let the market set prices for electricity.[122] Nevertheless, the threat and promise of greater competition affects the regulation of the industry. Public utility commissions are beginning to experiment with rate formulas by incorporating the incentives of a competitive market. Regulators are developing rate formulas that promote energy or economic efficiency.[123] They also are utilizing performance standards to encourage firms to spend money prudently instead of reflexively investing in capital expansion.[124] The object of these experiments is to align contemporary regulation with the contemporary market.

E. The New Market for Nuclear Power

The economic, financial, and regulatory status of electric utilities is in a period of profound fluctuation. Because the structure of the market has changed, both the way the utilities structure them-

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121. Distribution and subsidization (or redistribution and cross-subsidization) are political justifications for regulation. Any change in legal rules has distributional consequences. Coase, *The Problem of Social Cost*, 3 J. LAW & ECON. 1 (1960). Currently, one could argue that large industrial users subsidize smaller residential users. *See* L. HYMAN, *supra* note 23, at 185. Market based prices, then, have the potential of raising costs to residential consumers. If electricity rates do not reflect market value, however, then larger users move off line, further increasing costs to residential consumers.

122. *See* P. JOSKOW & R. SCHMALENSEE, *supra* note 13, at ch. 14; Collins, *supra* note 21, at 184-91; Varley, *Is the Electric Utility Industry Ready for Deregulation?*, PUB. UTIL. FORT., Sept. 19, 1985, at 17. L. Hyman, The Future of the Electric Utility Industry (June 24, 1985) (paper on file with authors).

Although competition is clearly increasing, total deregulation in the near term is unlikely because some segments of the electricity fuel cycle are less competitive than others. A consideration of the separate elements of the fuel cycle—generation, transmission, and distribution—demonstrates that the market for generation is more competitive than the markets for transmission or distribution. Furthermore, some classes (large industrial users) have more flexibility than other classes (residential users). Deregulation is further complicated by the fact that most electric utilities integrate those functions.

123. *See* FEDERAL ENERGY REGULATORY COMMISSION, FINAL REPORT: INCENTIVE REGULATION IN THE ELECTRIC UTILITY INDUSTRY (1983); Costello, Fulp, & Monson, *Incentive and Economic Development Rates as a Marketing Strategy for Electric Utilities*, PUB. UTIL. FORT., May 15, 1986, at 27.

124. *See* Smith & Dickter, *Living With Standards of Performance Programs*, PUB. UTIL. FORT., Aug. 16, 1984, at 26.

selves financially and the way public utility commissions set rates are being altered. Competition challenges the natural monopoly concept, thus forcing policy makers to question the historic economic model of utility regulation. Next, highly leveraged financing has put nuclear utilities in a severe credit crunch, forcing them to engage in short-term accounting techniques expressly for the purpose of stimulating cash flow through regulatory relief. Finally, the rate-making process reflects the impact of changes in economics and finances. Utilities are being forced to compete and will not enjoy the regulatory subsidies they once did. Conservation and energy efficiency[125] are becoming increasingly attractive to users. Electric, particularly nuclear, utilities must realize that the traditional capital expansion view of the world can no longer be taken for granted. Instead, utilities are losing their preeminent position as suppliers of electricity. Utilities must respond to the changing supply and demand characteristics of a post-industrial economy.

Nuclear utilities alone did not create this new environment. Rather, they are the most visible and logical consequence of a capitalist and industrial expansionist ideology. Both the traditional economic model and the regulatory response to that model are artificial constructs that are based on a policy commitment to large, high technology, central power stations. Clearly, nuclear power plants fit that image. Equally clearly, that image is wrong in a more competitive market and in a political milieu not uniformly committed to nuclear power. If utilities can begin to cope with unanticipated expenses in a thoughtful, planned manner, nuclear utilities may be given the opportunity to reemerge in a newly evolving, more competitive post-industrial market.[126] The remaining question is: What should be done with the massive, mistaken investments in nuclear power? This Article addresses that question next. In answering that question, this Article begins to develop a replacement for the traditional model.

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125. For a discussion of the importance of utility efforts to encourage customers to conserve electricity, see Lovins, *Saving Gigabucks with Negawatts*, PUB. UTIL. FORT., Mar. 21, 1985, at 19.

126. *See supra* notes 40 and 41 and accompanying text.

III. Regulatory Responses to Nuclear Market Failure

A. Introduction

To satisfy their unprecedented revenue requirements—which internal and external funding sources could not satisfy—utilities turned to state and federal regulators.[127] These regulators were caught in an environment that was changing politically as well as economically. The once unified promotional nuclear policy began splintering badly, particularly after TMI, and electricity costs were escalating rapidly. State public utility commissions responded by being more politicized than at any other time in their history.[128] These once dormant bodies, which were the refuge of political patronage, awoke and became quite activist.[129] Armed with the traditional model of utility regulation, public utility commissions were presented with anything but traditional questions in an uncertain market. Specifically, they were being asked to save large central power stations by levying the costs of mistaken investment on ratepayers.

The existence of nuclear transformation is evidenced by the fact that during this transition period nuclear regulation confronts a duality between capital expansion rate making and competitive

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127. Note that public utilities commissions do not regulate in isolation. Rather, energy policy is the result of a complex institutional process. *See generally* Tomain, *supra* note 9 (discussing the impact of the Law-Policy conflict on energy policy). In particular, the legislative and judicial branches check public utilities commissions. For a description of current utility legislation, see Olson, *supra* note 118.

128. *See* D. Anderson, Regulatory Politics and Electric Utilities: A Case Study in Political Economy 33-88 (1981); W. Gormley, The Politics of Public Utility Regulation (1983); P. Navarro, *supra* note 99, 95-109; P. Navarro, The Policy Game: How Special Interests and Ideologues are Stealing America 155-81 (1984); Wiens, *Citizen Perspective in the Wolf Creek Rate Case*, 33 U. Kan. L. Rev. 469 (1985).

129. The activism manifested itself in more contentious public utilities commission hearings. Commissioners became more vocal on such issues as the need for power, conservation, and environmental matters. Public participation increased as interest groups organized in response to escalating costs. *See* D. Anderson, *supra* note 128; W. Gormley, *supra* note 128; P. Navarro, *supra* note 128. *See generally* J. Buchanan & G. Tullock, The Calculus of Consent: Logical Foundations of Constitutional Democracy 44-62 (1965) (discussing how individuals decide to organize and take collective action); M. Olson, The Logic of Collective Action: Public Goods and the Theory of Groups (1965) (discussing collective action).

rate making.[130] The central conflict between these two rate-making modes is that the desire to protect consumers confronts the perceived need to shelter investors.

Although this conflict between ratepayers and shareholders may appear easy to balance with a "split the difference" attitude institutionalized as policy,[131] such an approach is impossible to reconcile as a matter of economic theory. No economic model,[132] no mat-

130. A policy transition can be analogized to the classic example of the middle period in the development of a common law rule:

> Once a rule has been announced, its second stage begins during which cases are included within and without the rule, distinctions become fuzzy and sometimes contradictory, and reasoning is questionable. All of which leads to the demise and replacement of the rule. The hallmark of this phase of rule development is a certain amount of lumpiness. Some lumpiness (more charitably, flexibility) is healthy because the dynamic of the process allows law to adapt. Too much flexibility is properly characterized as confusion, and this is an unhealthy state in which the dynamic of the law breaks down.

Tomain, *Contract Compensation in Nonmarket Transactions*, 46 U. PITT. L. REV. 867, 890-91 (1985) (footnotes ommitted) (based on B. CARDOZO, THE NATURE OF THE JUDICIAL PROCESS (1921); E. LEVI, AN INTRODUCTION TO LEGAL REASONING (1949); K. LLEWELLYN, THE COMMON LAW TRADITION DECIDING APPEALS (1960)).

131. In fact, the Illinois legislature has adopted just such a position by promulgating a statute that directs the Illinois Commerce Commission to initiate rule-making proceedings to establish factors for allocating plant cancellation costs between shareholders and ratepayers. *See* ILL. ANN. STAT. ch. 111 ⅔, ¶ 9-216 (Smith-Hurd Supp. 1986); *see also* ME. REV. STAT. ANN. tit. 35, § 52-B (Supp. 1986) ("In determining the ratemaking treatment for a utility's investment in cancelled or abandoned electric generating facilities, the commission shall balance the interests of the utility and ratepayers in a just and reasonable manner in each individual case.").

132. A graphic economic model is presented in Averbach & Freireich, *Nuclear Cancellations: Economic and Legal Bases for Allocating Losses*, in MSU PUBLIC UTILITIES PAPERS, AWARD PAPERS IN PUBLIC UTILITY ECONOMICS AND REGULATION 325, 333-39 (1982). The authors define their model as:

> Costs incurred for cancelled nuclear projects should be borne by shareholders and ratepayers in a manner reflecting the benefits each group would ultimately have received from a completed, operational plant. Costs, in other words, should be borne in the same proportion as benefits would have been enjoyed.
>
> Once the appropriate allocation of costs has been derived, a mechanism is required to effect the proper sharing. The method we propose is to allow recovery by the company of its sunk principal through amortization, but to disallow any rate base treatment, interest allowance, or carrying charges on the unamortized balance. By choosing a given amortization period and calculating the value to the company of the amount recovered from ratepayers over that term, one achieves a sharing of costs in the desired proportion.

Id. at 327.

ter how loosely one uses the term "economic," can continually and consistently reconcile the competing claims of shareholders and ratepayers because these claims are, at bottom, mutually exclusive. The reconciliation that does work is essentially political. Accordingly, it dispenses with the necessity of developing a theory of regulation dependent upon a rigid economic calculus. This political response is "accommodationist."[133] The accommodationist re-

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The authors rely on noneconomic as well as economic justifications for their model, however:

> The merit of this proposal rests on several bases: (1) it is in accordance with established economic theory and principles; (2) it is in accordance with established principles of utility regulation; (3) it is in agreement with recent commission decisions involving cancelled nuclear plants; (4) it would promote the important public policy of encouraging large capital expenditures by utilities only for undertakings showing the highest promise of success; and (5) it is equitable.

Id.

At the conclusion of their article, the authors say their model (1) allows prudent costs and (2) disallows items not used and useful. Note, however, that they offer no economic theory to justify the allowance of sunk costs but not carrying costs. *See also* Stutz, *Risk Sharing in a Regulatory Industry*, PUB. UTIL. FORT., Apr. 3, 1986, at 29 (arguing that ratepayers and shareholders should split costs because the utilities' service obligation imposes more risk on shareholders to the benefit of the ratepayers).

133. "Accommodation" is a political response grounded on a pragmatic justification. *See, e.g.*, Galbraith, *The Stockman Episode* (Book Review), N.Y. REV. BOOKS, June 26, 1986, at 3:

> The point has often been made: If you hear someone in public life say that he is going to stand firmly on principle, you should take cover and warn others to do the same. There is going to be suffering. So it is, at least, in economic and social policy and action.
>
> This is not to say that stalwart ideological commitment is without purpose. A commitment to free enterprise or socialism, to liberalism, neoliberalism, conservatism, neoconservatism, or the new right, is eminently serviceable to self-esteem and as a form of self-identification. It also allows a certain freedom from thought: "That is my position and I stand by it." And it helpfully classifies political expression and behavior, makes it more predictable, and serves to unite people in a highly visible way beneath a common banner. Further, ideology brings a dignified righteousness to social, political, and economic expression and action: "I am, let me assure you, faithful to my cause."
>
> What is less often recognized is that rigorous ideological commitment is of greatly negative value for governing a country, especially for making economic policy, and is a positive threat to social tranquility and economic well-being. Economic and social institutions are in a constant process of change; ideological commitment, by its nature and strongly avowed virtue, is static. Accordingly, guidance therefrom is likely to be obsolete, obsolescent, or irrelevant. Never is it so comprehensive in guidance as to take account of the greatly diverse circumstances of real life. The United States has survived, at least until

sponse is temporary and transitional. Its intended purpose is to allocate immediate losses between ratepayers and shareholders as a matter of political judgment, not rational economic theory-building. The accommodationist response, although economically unsound, is nevertheless valuable. It provides a critique of the traditional model and provides a base for the development of the post-industrial model. State and federal responses to nuclear market failure serve as a prelude to Part IV of this Article, which analyzes the lessons of the nuclear transition and argues that the accommodationist response is a political antecedent to a more responsive regulatory theory in a changing economic world.

B. State Responses

State responses to mistaken nuclear investment[134] can be divided into three categories: those that protect consumers; those that protect owners; and those that balance and distribute the financial burden between ratepayers and shareholders. In making cost allocation decisions, regulators first rely on explicit statutory language. Next, in the absence of clear language, regulators inter-

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> now, by the willingness of governments, large and small, to make practical concessions to change and to diversity. A reluctant pragmatism has been our salvation.

See also S. BOWLES & H. GINTIS, DEMOCRACY AND CAPITALISM: PROPERTY, COMMUNITY, AND THE CONTRADICTIONS OF MODERN THOUGHT 33-34 (1986) (accommodation serves as a centripetal force holding together conflicts between economics and politics, money and power, and property and rights).

134. This Article defines "mistaken nuclear investment" to include cancelled plants, excess capacity, and underestimation of construction costs. *See supra* notes 111-13 and accompanying text. This section concentrates on cancelled plant decisions, and serves as a textual elaboration of the Appendix, which lists 56 cancelled nuclear plant decisions and charts their dispositions. The issue is: Who pays for mistaken nuclear investment? Three principle cost-bearing groups exist: ratepayers, shareholders, and taxpayers.

NUCLEAR PLANT CANCELLATIONS, *supra* note 14, at 71 states:

> A present-value analysis of the costs allocated to the three major payer groups for a hypothetical plant cancellation involving amortization over 10 years, with no return on the unamortized balance, yielded the following approximate distribution of costs: utility investors, 30 percent; utility ratepayers, 30 percent; and income taxpayers, 40 percent.

Each of these groups has a sound justification for escaping liability, yet no group remains unaffected as regulators roughly apportion costs. Utilities argue that they were following government commands; ratepayers argue that they are receiving no benefits; and taxpayers argue that they are scapegoats. *See* Tomain, *Law and Policy in the Activist State: Rethinking Nuclear Regulation*, *supra* note 3, at 212-34.

pret the pertinent statutes and case law and support their interpretations with policy arguments. The basic choice of decisional rules is between the "used and useful" test or the "prudent management" test.[135] The used and useful test protects ratepayers from absorbing cancellation costs. The prudent investment test protects shareholders from suffering extraordinary losses. Finally, regulators rely on analogous statutes to dispose of these issues.

1. Consumer Protection

States protect consumers generally for one or both of two reasons. First, they may feel compelled to adopt and rigidly apply the used and useful test. Rigid application of this test means that a plant must be on-line and operating with benefits to consumers before the utility can pass costs through by inclusion in the rate base. Second, these states may reach beyond specific statutory language and consider the issue of risk allocation. Consumer protectionist states accept the proposition that costs should be allocated to cost-bearing groups in direct proportion to the amount of assumed risk. Because ratepayers have little voice in the decision to embark on new projects, and utilities themselves reap the ultimate rewards if projects are successful, then utilities should bear the financial burden if projects fail.

In *Office of Consumers' Counsel v. Public Utilities Commission*,[136] the Ohio Supreme Court became the first state high court to exclude cancellation costs from the rate base. This decision is representative of the consumer protectionist position. The court based its decision on statutory language that allowed the utility to recover only the cost of rendering the public utility service for the test period. Although the Public Utilities Commission applied the prudent management test, the court reasoned that a utility is not given rate base treatment for property not actually used and useful in providing the public with utility services.[137] If the Public Utilities Commission and the utilities themselves needed financial relief, they should seek it from the legislature. "Absent such explicit

135. Colton, *Excess Capacity: Who Gets the Charge from the Power Plant?*, *supra* note 35, at 1137-41.
136. 67 Ohio St. 2d 153, 423 N.E.2d 820 (1981), *appeal dismissed*, 455 U.S. 914 (1982).
137. *Id.* at 163-68, 423 N.E.2d at 826-29.

statutory authorization, however," the court said, "the commission may not benefit the investors by guaranteeing the full return of their capital at the expense of the ratepayers."[138]

Although Ohio consistently has prevented costs associated with failed nuclear plants from being included in the rate base,[139] it has not retained an absolutely strict adherence to consumer protection. The Ohio Supreme Court has stated that the Public Utilities Commission has discretion to consider disallowance of cancelled plant costs when determining a fair and reasonable rate of return.[140] The Ohio Public Utilities Commission has acknowledged expressly the technique of raising rates of return to accommodate rate base disallowances as a means of aiding utilities faced with cancelled nuclear projects.[141] As a result, even states that explicitly adopt a consumer protectionist stance[142] feel compelled to accommodate the industry in recognition of their financial needs.

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138. *Id.* at 167, 423 N.E.2d at 829.

139. *See, e.g.*, Columbus & S. Ohio Elec. Co. v. Public Util. Comm'n, 10 Ohio St. 3d 12, 460 N.E.2d 1108 (1984) (upholding a construction work in progress disallowance regarding the cancelled Zimmer nuclear plant); Toledo Edison Co. v. Public Util. Comm'n, 12 Ohio St. 3d 143, 465 N.E.2d 886 (1984) (disallowing operating expenses for a cancelled unit).

140. "The question whether a decision of this court may have so increased the perceived risk to investors as to require a higher rate of return on common equity is one the commission may consider as a factor in its decision." Consumers' Counsel v. Public Util. Comm'n, 4 Ohio St. 3d 111, 115, 447 N.E.2d 749, 754 (1983).

141. Cleveland Illuminating Co., 46 Pub. Util. Rep. 4th (PUR) 63 (Ohio PUC 1982).

142. Several states, as reported in cases in the Appendix, follow Ohio in seeking to protect consumers from bearing the financial burden of nuclear plant cancellations. Wyoming, Oregon, Montana, New Hampshire, Indiana, and Pennsylvania use statutory language to protect consumers from bearing the costs of plant cancellations. Wyoming expressly incorporates the "used and useful" concept in its statute requiring the utility commission to "consider . . . the property and business of any public utility used and useful for the convenience of the public . . . ." WYO. STAT. § 37-2-119 (Supp. 1986). Under this rationale, Wyoming's Supreme Court denied recovery from ratepayers for the costs of cancelling the Pebble Springs and WPN-4 and -5 nuclear power plants because they never came on line. Pacific Power & Light v. Public Serv. Comm'n, 677 P.2d 799 (Wyo. 1984), *cert. denied*, 469 U.S. 836 (1985).

Oregon, under "Ballot Measure 9," denies utilites rate collection derived from any property "not presently used for providing utility service to the customer." OR. REV. STAT. § 757-355 (1983). Though two Oregon utilities requested rate relief to compensate for cancellation costs at Skagitt/Hanford and WPN-5, the Oregon Public Utilities Commission refused recovery of those costs incurred after passage of Ballot Measure 9. It granted "prospective" relief to consumers because at the time "utility management was fully aware that its investment was a risk and the previous risk-sharing relationship between investors had been altered." Anticipated Abandonment of Electricity Generating Plant Projects by Portland

The pressure for financial aid is strong. If a nuclear project is cancelled in a state following the used or useful test, the utility has an incentive to convert to another resource, such as coal, in order to put a plant on-line. In Ohio, Cincinnati Gas & Electric, Dayton Power & Light, and Columbus & Southern Ohio Electric cancelled the ninety-seven percent complete Zimmer plant after conducting an audit that indicated that $1.8 billion, in addition to the $1.7 billion already spent, was needed to complete construction of the plant. Even though state law precluded rate base treatment of cancellation costs, and a consulting report sponsored by the public utilities commission detailed mismanagement in the construction of the nuclear plant,[143] the threat of coal conversion, which would cost another $1.7 billion, pressured consumers into absorbing some costs through a negotiated settlement.[144]

Regulators also offer policy considerations to support consumer protection. They stress that even though the service obligation distinguishes utilities from nonregulated industries, utility investment involves less risk than investments in nonregulated businesses. Allowing recovery from ratepayers of all losses incurred by utilities expands the monopoly advantage to the point where investments would become risk-free.[145] If consumers bear all costs, then no risk is placed on shareholders. Utilities therefore would be encouraged to "venture into activities having a very small chance of economic success [because they have] the knowledge of no loss [to the util-

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General Elec. Co. and Pacific Power & Light Co., [State Transfer Binder 1983-85] Util. L. Rep. (CCH) ¶ 24,202, at 57,236 (Or. PUC Dec. 27, 1983); *see also* Portland General Elec. Co., 49 Pub. Util. Rep. 4th (PUR) 274 (Or. PSC 1982) (PG&E's writeoff of its $132 million interest in Pebble Springs was absorbed by the utility, not the ratepayers.); *cf.* IND. CODE ANN. §§ 8-1-2-1, 8-1-2-4 (Burns Supp. 1986); MONT. CODE ANN. § 69-3-109 (1985); N.H. REV. STAT. ANN. § 378:30-a (1984); 66 PA. CONS. STAT. ANN. § 1313 (Purdon Supp. 1985).

143. O'BRIEN-KREITZBERG & ASSOCIATES, INC., WM. H. ZIMMER NUCLEAR POWER STATION: ANALYSIS OF POSSIBLE MISMANAGEMENT AND CORRELATED COST Executive Summary (June 15, 1984) (copy on file with authors). "Cincinnati Gas & Electric is responsible for substantial mismanagement in the design and construction of the Zimmer Nuclear Generating Station." *Id.* at 2-3. "[T]he estimated cost of mismanagement for this option [cancellation] is $1,720,000,000 to March 31, 1984. Because of caretaking cost of AFUDC, this cost will continue to grow." *Id.* at 2-8.

144. Restatement of the Accounts and Records of the Cincinnati Gas & Elec. Co., [State Decisions Current] Util. L. Rep. ¶ 24,963 (Ohio PUC Nov. 26, 1985).

145. *See* Pacific Power & Light Co., 53 Pub. Util. Rep. 4th (PUR) 24, 28 (Mont. PSC 1983).

ity] should the activity fail and great gain should the small chance of success occur."[146]

Another policy consideration for regulators is the lack of public participation in investment decisions. Because the public frequently is precluded from accepting, rejecting, or commenting on utility building decisions, this argument holds that the rate-paying public should not bear the burden of isolated management construction decisions.[147] Instead, regulators reason, stockholders should carry investment responsibility. Stockholders, as owners of utilities, choose the managers of their utility and thereby maintain a voice in utility management. The planning of construction of new units is a management function under control of the stockholders "[who] should therefore bear any cost related to such cancellations."[148]

Decision makers also frequently note that utilities inadequately justify expenses incurred from plant construction. Accordingly, when utilities cannot defend the prudence of incurred costs, commissions have denied rate base recovery.[149] Even when public utilities commissions incorporate costs of plants not used and useful in the rate base, they cannot pass through expenses imprudently in-

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146. Pacific Power & Light Co. v. Public Serv. Comm'n, 677 P.2d 799, 806 (Wyo. 1984), *cert. denied*, 469 U.S. 836 (1985).

147. *Id.*

148. Arizona Pub. Serv. Co., 38 Pub. Util. Rep. 4th (PUR) 547, 556 (Ariz. Corp. Comm'n 1980). For examples of anti-construction work in progress statutes, see Mo. ANN. STAT. § 393.135 (Vernon Supp. 1986); 66 PA. CONS. STAT. ANN. § 1315 (Purdon Supp. 1985).

Furthermore, the Montana Public Service Commission reasoned that it would be "patently unfair" to force ratepayers to carry the financial burden of plant cancellations which "they had no part in conceiving, which failed through no fault of theirs, and which will never benefit them." Pacific Power & Light Co., 53 Pub. Util Rep. 4th (PUR) 24, 29 (Mont. PSC 1983).

149. *See* Connecticut Light & Power Co., Nos. 810602 and 810604 (Conn. DPUC Westlaw, Pub. Util. Rep. Com. file 1981) (all expenses denied after commission determined project ill-advised); Washington Water Power Co., 65 Pub. Util Rep. 4th (PUR) 100, 125 (Idaho PUC 1985) (all costs denied after Dec. 31, 1981, because imprudently incurred); Union Elec. Co., 53 Pub. Util. Rep. 4th (PUR) 565, 592 (Ill. Commerce Comm'n 1983) (all uncertain costs denied); Boston Edison Co., 46 Pub. Util. Rep. 4th (PUR) 431, 471 (Mass. DPU 1982) (expenses incurred after July 1, 1980, denied because imprudently incurred); Houston Lighting & Power Co., 50 Pub. Util. Rep. 4th (PUR) 157, 201 (Tex. PUC 1982) (costs incurred after Jan. 1, 1980, denied as imprudent expenditures); Washington Utils. & Transp. Comm'n v. Puget Sound Power & Light Co., 62 Pub. Util. Rep. 4th (PUR) 557, 585 (Wash. UTC 1984) (all authorized funding used during construction denied after June 30, 1980).

curred by the utility.[150] Because of the difficulty in reconstructing the economic, social, and political climate in which the utility formulated its original decision to build, however, decision makers have utilized the imprudence concept only infrequently.[151]

When statutes do not specifically require the application of the used and useful test, some commissions and courts have relied on other statutes to determine legislative intent. The New Hampshire legislature, for example, adopted an anti-construction work in progress statute to prevent construction work in progress from being included in the rate base until construction is complete.[152] Although the language focuses strictly on construction work in progress, the New Hampshire Supreme Court interpreted the statute as preventing rate base treatment of cancellation costs incurred after its passage.[153] Conversely, Indiana has a statute that can be interpreted reasonably as allowing public utilities commissions to accommodate both ratepayers and shareholders in cost allocations, yet the state Supreme Court refused to allow the utility to pass abandonment costs through to ratepayers.[154]

States that protect consumers from costs of nuclear facilities that are not used and useful follow similar reasoning when the can-

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150. The New York Public Service Commission, for example, ruled that $1.395 billion of Shoreham nuclear power station overruns must be recovered from Long Island Lighting Co.'s shareholders, not ratepayers, because of imprudent management. Long Island Lighting Co.—Phase II—Proceeding on Motion of Comm'n to Investigate Cost of Constr. on Shoreham Nuclear Generating Facility, [State Decisions Current] Util. L. Rep. (CCH) ¶ 24,922, at 60,557 (N.Y. PSC Dec. 16, 1985); *see also Lilco is Blamed for $1.2 Billion of Shoreham Overrun*, N.Y. Times, Mar. 14, 1985, at B2, col. 1.

151. Small, *FERC Electric Rate Primer*, 5 ENERGY L.J. 107, 110 & n.18 (1984).

152. N.H. REV. STAT. ANN. § 378: 30-a (1984).

153. Public Serv. Co. of N.H., 125 N.H. 46, 480 A.2d 20 (1984). Missouri adopted a statute modelled after the New Hampshire anti-construction work in progress legislation. The Missouri Supreme Court interpreted the statute as distinguishing between construction work in progress and cancellation costs, however, and thus permitted inclusion of the cancellation costs in the rate base. Missouri *ex rel.* Union Elec. Co. v. Missouri Pub. Serv. Comm'n, 687 S.W.2d 162 (Mo. 1985).

154. Indiana's Supreme Court refused to allow full recovery of Bailly N-1 nuclear plant costs over a 15-year amortization period. The Indiana court applied the "used and useful" statutory standard for establishing reasonable costs and thus disallowed pass-through of costs even though the statute arguably permits the public utilities commission to make accommodations in setting rates. Citizens Action Coalition of Ind., Inc. v. Northern Ind. Pub. Serv. Co., 485 N.E.2d 610, 616-17 (Ind. 1985). The statute defined utility service to include the "use or accommodation afforded consumers . . . ." IND. CODE ANN. § 8-1-2-1 (Burns Supp. 1986).

cellation is only temporary. Pennsylvania faced this dilemma in dealing with the accident at Three Mile Island. During the "downtime" of the TMI units, the public utilities commission reduced utility rates because the plant was not "used and useful." The utility objected, arguing that rates must be set at levels preserving its financial integrity. The Pennsylvania Supreme Court disagreed and indicated that utilities do not have a constitutionally guaranteed right to rates that preserve positive financial status for utilities; any other result, the court reasoned, would make rate base determinations concerning used and useful plants superfluous.[155]

Consumer protectionism is based on statutory and policy arguments emanating from the used and useful test. Ratepayers should not pay when they receive no electricity. Ratepayers receive no electricity when utilities cancel plants, over-build or when plants are under construction. The consumer protectionist position also has a long-run economic efficiency argument. If ratepayers subsidize mistaken financial decisions, then overinvestment—waste—is encouraged.

2. *Investor Protection*

Not all regulatory authorities believe that utilities should bear the entire burden of the decision to invest in nuclear plants. Some public utilities commissions[156] follow a philosophy that consumers benefit even from cancelled plants because utilities are honoring their service obligation by providing system reliability. As a result, the costs of cancelled plants are included in the rate base and

155. Pennsylvania Elec. Co. v. Pennsylvania Pub. Util. Comm'n, 509 Pa. 324, 502 A.2d 130 (1985); *see also* Barasch v. Pennsylvania Pub. Util. Comm'n, 507 Pa. 496, 491 A.2d 94 (1985); Barasch v. Pennsylvania Pub. Util. Comm'n, 507 Pa. 430, 490 A.2d 806 (1985). Similarly, California's Public Utilities Commission lowered the rate base when Pacific Gas & Electric closed the Humboldt Plant for refueling and seismic modifications. Pacific Gas & Elec. Co., 34 Pub. Util. Rep. 4th (PUR) 1, 23-24 (Cal. PUC 1979). The issue concerning whether public utilities commissions must preserve the financial integrity of the regulated utility or may disallow costs attributable to imprudence, excess physical capacity, and excess economic expenses is currently before the Supreme Court in Kansas Gas & Elec. v. Kansas Corp. Comm'n, 239 Kan. 483, 720 P.2d 1063 (1986), *appeal granted*, 107 S. Ct. 1281 (1987).

156. *See, e.g.*, Gulf Power Co., 43 Pub. Util. Rep. 4th (PUR) 15, 17 (Fla. PSC 1981), *aff'd*, 410 So.2d 492, 494 (Fla. 1982); Maine Pub. Serv. Co., 67 Pub. Util. Rep. 4th (PUR) 101, 117 (Me. PUC 1985); Rochester Gas & Elec. Co., 45 Pub. Util. Rep. 4th (PUR) 386, 399 (N.Y. PSC 1982).

passed through to consumers. States that adopt a systemic, rather than a project specific, approach to cancellation costs utilize a prudency standard. Under this approach, the state disallows some imprudent costs on specific projects even though it generally includes cancellation costs in the rate base.[157] Investor protection states rest on the service obligation argument.

Utilities argue that because they incurred costs of cancelled plants as part of their service obligation, the public should share in these costs. They reason that market risk analysis is inapplicable because, unlike competitive industries, utilities are not free to close shop; consumers have a legal right to demand service. Because ratepayers enjoy the benefits of a system of readily available electricity, they should share in the risk that a specific project can fail.

As policy support for investor protection, regulators note that at the time nuclear plant construction was begun, the federal government was vigorously promoting the development of nuclear power. In the 1970s, the energy crisis and the resulting need to become less dependent on foreign oil increased reliance on nuclear power. Some public utilities commissions hesitate to deny financial assistance to a utility when they find that the decision to build the plant was a prudent effort to fulfill the utility's service obligation to the public, particularly when nuclear power was so promoted. Prudently incurred cancellation costs should be given rate base treatment, therefore, as should cost overruns and excess capacity.

Once regulators decide to have ratepayers absorb cancellation costs, two basic ways exist to structure recovery: costs can be included in the rate base, or amortized over a period of years. The choice of method turns on the amount that the utilities requested. Small amounts either will be included in the rate base or given short amortization periods as depicted by the cases in the Appendix. An important subsidiary issue arises if costs are amortized: Should the utility earn a return on the unamortized balance? In-

157. New York's Public Service Commission, for example, follows the practice of allowing full recovery of all sunk costs, including carrying charges. The New York commission rejected the idea that costs of the abandoned Sterling nuclear project should be allocated between ratepayers and shareholders according to benefits each would have received had the project been completed and instead put the burden on ratepayers entirely. In other words, it rejected the Averbach & Freireich model, *supra* note 132, in Central Hudson Gas & Elec., 67 Pub. Util. Rep. 4th (PUR) 459, 468 (N.Y. PSC 1985).

vestor protectionists argue that utilities should earn a return, otherwise they are denied full recovery of their investment.[158] Because principal and interest costs exist to be allocated, regulators can adjust these variables when they desire to allocate costs between ratepayers and shareholders.

3. Accommodation

Amortizing cancellation costs, the method used by most states and the federal government,[159] balances costs between ratepayers and shareholders. Once the public utilities commission determines that ratepayers will accept some responsibility, various allocation schemes are available. Most commissions note the nonrecurring nature of construction expenses and allow utilities to recoup costs through the rate base. This method gives investors a rate of return on at least the prudently incurred costs. Another method classifies cancellation costs as expenses, as opposed to providing rate base treatment, and subsequently amortizes the amount.

Cash flow improves for utilities with shorter amortization periods and with rate base treatment of the unamortized balance. Ratepayers argue that if plant costs are amortized, the period should be longer in order to prevent rate shock. Utilities counter, however, that they need to recover invested costs as quickly as possible to keep a tenable cash flow and to maintain financial health. No predetermined method exists for determining amortization periods. On the whole, the length of time can vary from one to three years[160] up to ten, fifteen, or twenty years.[161] Inconsistency some-

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158. Gary & Roach, *supra* note 115, at 486-506 (arguing for inclusion of all prudently incurred cancellation costs in the rate base and a return on the unamortized balance).

159. *See* Jersey Central Power & Light Co. v. Federal Energy Regulatory Commission, 860 F.2d 1168 (D.C. Cir. 1987); South Dakota Pub. Util. Comm'n v. Federal Energy Regulatory Comm'n, 690 F.2d 674, 677 (8th Cir. 1982); New England Power Co., [Federal New Matters Current] Util. L. Rep. (CCH) ¶ 13,064, at 19,350 (FERC July 24, 1985); Rochester Gas & Elec. Corp., 45 Pub. Util. Rep. 4th (PUR) 386, 405 (N.Y. PSC 1982).

160. *See* United Illuminating Co., 55 Pub. Util. Rep. 4th (PUR) 252, 294 (Conn. DPUC 1983); Maine Pub. Serv. Co., 67 Pub. Util. Rep. 4th (PUR) 101, 118 (Me. PUC 1985); Fitchburg Gas & Elec. Light Co., 52 Pub. Util. Rep. 4th (PUR) 197, 221 (Mass. DPU 1983); Commonwealth Elec. Co., 47 Pub. Util. Rep. 4th (PUR) 229, 237 (Mass. DPU 1982); Northern States Power Co., 42 Pub. Util. Rep. 4th (PUR) 339, 363 (Minn. PUC 1981); Wisconsin Pub. Serv. Corp., 52 Pub. Util. Rep. 4th (PUR) 389, 394 (Wis. PSC 1983).

161. Jersey Cent. Power & Light Co. v. Federal Energy Regulatory Comm'n, 730 F.2d 816, 820 (D.C. Cir. 1984), *vacated*, 768 F.2d 1500 (D.C. Cir. 1985); United Illuminating Co., 64

times exists within states regarding the length of amortization periods.[162] Variable amortization recovery times demonstrate not only that public utilities commissions are examining different considerations for different plants, but also that uncertainty exists among the public utilities commissions regarding the regulatory theory underpinning particular choices.

A second and significant decision facing public utilities commissions is how to allocate the unamortized balance of costs.[163] The

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Pub. Util. Rep. 4th (PUR) 319, 341 (Conn. DPU 1984); Potomac Elec. Power Co., 29 Pub. Util. Rep. 4th (PUR) 517, 528-29 (D.C. PSC 1979); Washington Water Power Co., 65 Pub. Util. Rep. 4th (PUR) 100, 119 (Idaho PUC 1985); Detroit Edison Co., 52 Pub. Util. Rep. 4th (PUR) 318, 326 (Mich. PSC 1983); Carolina Power & Light Co., 49 Pub. Util. Rep. 4th (PUR) 188, 218 (N.C. Utils. Comm'n 1982); Atlanta City Electric Co., 51 Pub. Util. Rep. 4th (PUR) 109, 115 (N.J. Bd. Pub. Utils. 1983); Houston Lighting & Power Co., 50 Pub. Util. Rep. 4th (PUR) 157, 200 (Tex. PUC 1982); Virginia Elec. Power Co., 54 Pub. Util. Rep. 4th (PUR) 1, 13 (W. Va. PSC 1983).

162. The Connecticut Department of Public Utility Control, like New York's Public Service Commission, has placed the burden of loss on consumers. The Department allowed United Illuminating Co. to recover $14.7 million of costs for Pilgrim Unit 11 by amortization over a two-year period, but allowed a 10-year amortization period for a $200 million investment in another plant. The Department rejected arguments that the utility should not recover costs because the unit had never been "used and useful," that the company's financial integrity was not endangered, and that the utility was bound by earlier representations that it would bear the loss if the unit was not completed. Instead, the Department reasoned that because United Illuminating acted reasonably and with the Department's approval, it should not be penalized if it was satisfying obligations of law. United Illuminating Co., 55 Pub. Util. Rep. 4th (PUR) 252, 268 (Conn. DPUC 1983). In a later case, the Department treated cancellation costs differently and allowed a utility full recovery of expenses, except for carrying charges on the unamortized portion. United Illuminating Co., 64 Pub. Util. Rep. 4th (PUR) 319, 340-41 (Conn. DPUC 1984).

In Massachusetts, the Department of Public Utilities has varied between amortization periods of three and 10 years. *See, e.g.*, Boston Edison Co., 46 Pub. Util. Rep. 4th (PUR) 431, 473 (Mass. DPU 1982) (amortization of 13 years for Pilgrim II); Commonwealth Elec. Co., 47 Pub. Util. Rep. 4th (PUR) 229, 233 (Mass. DPU 1982) (amortization of three years for Montague I). In Washington, the amortization period has fluctuated between zero and 10 years. *See, e.g.*, Washington Util. & Transp. Comm'n v. Puget Sound Power & Light, 62 Pub. Util. Rep. 4th (PUR) 557, 586 (Wash. UTC 1984) (amortization period of 10 years for Pebble Springs plant); Washington Util. & Transp. Comm'n v. Puget Sound Power & Light, 51 Pub. Util. Rep. 4th (PUR) 158, 168-82 (Wash. UTC 1983) (amortization period of zero years for Pebble Springs and WNP-5 plants; instead, 2.5% added to the rate of return).

163. If, hypothetically, a utility is confronting $1,000,000 in cancelled plant costs and the public utilities commission agrees to a 10-year amortization period, then in year 1, $100,000 will be included in the rate base but the interest on the remaining $900,000 will also need regulatory attention. In year 2, another $100,000 will be treated in the rate base, but the $800,000 remaining will again be earning interest charges that must be paid. The example goes on through the 10-year period with the utility acquiring cumulative carrying charges

ultimate investor protection is to give rate base treatment to the unamortized balance as well as to cancellation costs.[164] The majority of states divide the burden of cancellation costs between investors and ratepayers by amortizing costs but denying rate base treatment for the unamortized balance. Although the policy behind this allocation is easy to state, the precise theory on which the allocations rest is not so easy to identify. Consumers want reasonable rates and reliable service; utilities want financial health; and investors want a return on investment. Furthermore, consumer protection may harm utilities, and shareholder protection requires subsidization by ratepayers. The natural tendency is to develop an accommodationist position that attempts to protect both interests. Amortizing or expensing prudently incurred costs helps shareholders. Denying rate base treatment for the unamortized balance does not penalize ratepayers unnecessarily. In addition, threats of bankruptcy and service interruption have persuaded some public utili-

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because of interest incurred by the unamortized balance of cancellation costs. The burden is alleviated, however, if this amount is given rate base treatment.

The Maine Public Utilities Commission has a policy of allocating the costs of cancelled plants between shareholders and ratepayers by allowing amortization without rate base treatment of only that part of the investment that does not constitute capitalized "Allowance for Funds Used During Construction" (AFUDC). Central Me. Power Co. v. Maine Pub. Util. Comm'n, 433 A.2d 331, 334 (Me. 1981); Bangor Hydro-Electric Co., 46 Pub. Util. Rep. 4th (PUR) 503, 557-58 (Me. PUC 1982). In the case of a cancelled plant, AFUDC represents the carrying costs of a plant that will never provide service. The Public Utilities Commission decided that a reasonable balancing of the burden of the cancelled plant required shareholders to shoulder all carrying costs. The Commission refused to disallow only the equity portion of AFUDC because the "equitable share of risk that should be borne by investors is the risk of loss of the expected return on the investment." *Id.* at 557. This includes the return on debt as well as on equity.

Distinguishing between debt and equity has superficial appeal. Bondholders should be protected more than shareholders, the argument goes, because shareholders are the owners of the utility and bondholders are only lenders. The argument makes less sense when one realizes that both bondholders and shareholders assess risk based on the same information about capital structure, financial risk, and liability.

164. Several states follow this investor protectionist method: Florida, in Gulf Power Co., 43 Pub. Util. Rep. 4th (PUR) 15, 16 (Fla. PSC 1981), *aff'd*, 410 So. 2d 492, 494 (Fla. 1982); Maine, in Maine Pub. Serv. Co., 67 Pub. Util. Rep. 4th (PUR) 101, 118 (Me. PUC 1985); New York, in Rochester Gas & Elec. Co., 45 Pub. Util. Rep. 4th (PUR) 386, 411 (N.Y. PSC 1982); and North Carolina, in Carolina Power & Light Co., 49 Pub. Util. Rep. 4th (PUR) 188, 217 (N.C. Utils. Comm'n 1982).

ties commissions to allow recovery of some abandonment costs or to grant emergency rate hikes.[165]

Although states articulate and apply different rules, they are also reevaluating the nature of public utilities as regulated monopolies. As the Vermont Public Service Board put it:

> How to treat the loss of abandoned plant presents one of the fundamental regulatory paradoxes. Regulation's role is to supply the discipline of the marketplace to a monopoly that provides an essential service. If an unregulated company subject to competition makes a bad investment, the company is unable to pass that along to its customers and its shareholders suffer from decreased earnings or from the ultimate economic fate of bankruptcy. On the other hand, an unregulated company can also earn "surpluses" above the average return in the industry which will cushion it in hard times. However, if a regulated company providing an essential service makes an investment that is later abandoned, to disallow it completely and reduce earnings only raises the cost of debt and equity to the company, and this cost is passed along to customers in the long run.[166]

In allocating losses between ratepayers and investors, public utilities commissions try to balance the utilities' burdens as a regulated industry against their privileges as monopolies.[167]

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165. *See, e.g.*, Application of Consumers Power Co. for Authorization to Increase Its Rates Applicable to the Sale of Electricity, [State Transfer Binder 1983-1985] Util. L. Rep. (CCH) ¶ 24,675 (Mich. PSC March 29, 1985).

166. Central Vt. Pub. Serv. Corp., 49 Pub. Util. Rep. 4th (PUR) 372, 392 (Vt. PSB 1982).

167. *See* Boston Edison Co., 46 Pub. Util. Rep. 4th (PUR) 431, 461 (Mass. DPU 1982), *aff'd sub nom.* Attorney General v. Department of Pub. Utils., 390 Mass. 208, 455 N.E.2d 414 (1983). The Massachusetts Department of Public Utilities (MDPU) directly confronted the nature of accommodation:

> The primary mandate that rates balance the interests of consumers and investors must be applied here based upon our judgement of the appropriate factors that affect such a balancing. It seems indisputable to us that no mathematical formula, including one that evenly divides dollar losses, can properly and logically effect a meaningful balance of interests. After considerable review, we have concluded that the factors which properly bear on the allocation of the loss at issue here are the following:
>
> a. the prudence of the company's actions throughout the history of the project;
>
> b. the equity and fairness of any proposed allocation; and
>
> c. the necessity of adjusting the financial impacts of any allocation to ensure the adequacy of future service.

46 Pub. Util. Rep. 4th (PUR) at 461.

The accommodationist position, which balances the interests of ratepayers and shareholders, is also reproduced in regulatory decisions regarding construction work in progress[168] and excess capacity.[169] Although no uniform rule exists for regulatory treatment of either construction work in progress or excess capacity, the trend is clear. The federal government and most states, excluding those with specific anti-construction work in progress legislation, allow some construction work in progress in the rate base to improve cash flow and reduce rate shock. Similarly, the states that have addressed the excess capacity issue allow a healthy reserve margin, usually twenty percent, before disallowing excess capacity in the rate base.

Who pays for mistaken investments? Through a series of accommodations and trade-offs, the near unanimous answer is that ratepayers will pick up some charges and shareholders other charges. In the process, regulators must now address how best to treat, for rate-making purposes, large investments in long lead-time projects. The answers that regulators are developing will directly affect the financial structure and capital budgeting of utilities.

4. Synthesis of State Responses

The various state responses pose a seemingly intractable dilemma. Should consumers pay now for the construction of specific projects that (1) may not be completed, or (2) may be used by a different generation of consumers? Or should consumers pay to maintain the integrity of the system as a trade-off for the utility's

In allocating $278 million of cancellation costs, the MDPU decided to amortize over a 13-year period the direct costs and the debt component of authorized funds used during construction. The MDPU also allowed a carrying charge on the unamortized portion of the prudent expenditures. It did not allow the unamortized portion of the plant into the rate base, however, on the premise that the utility would regain expenses but at a lesser rate than its allowed rate of return. *Id.* at 472-73.

168. *See, e.g.*, Mid-Tex Elec. Co-op., Inc. v. Federal Energy Regulatory Comm'n, 773 F.2d 327, 346-47 (D.C. Cir. 1985); Illinois Power Co. [State Decisions Current] Util. L. Rep. (CCH) ¶ 24,794, at 59,696 (Ill. Com. Comm'n Aug. 7, 1985); Green v. Pennsylvania Pub. Util. Comm'n, 81 Pa. Comm. 55, ___, 473 A.2d 209, 214 (1984), *aff'd*, 490 A.2d 806 (Pa. 1985). *But see* People's Org. for Wash. Energy Resources v. Utilities & Transp. Comm'n, 101 Wash. 2d 425, ___, 679 P.2d 922, 925 (1984) (construction work in progress not disallowed if the plant is used and useful).

169. *See* Colton, *Excess Capacity: A Case Study in Ratemaking Theory and Application*, *supra* note 35.

service obligation? Either way somebody loses because the regulatory system artificially imposes the risks rather than taking them from the market. Answering these questions depends on a frame of reference. If the problem is analyzed from a project-specific standpoint, then cancelled plant losses should be imposed on utilities which undertook construction risks. In contrast, if regulators use a systemic analysis, then ratepayers assume some risk because they are the beneficiaries of the state-imposed service obligation. Both arguments are partially right—and hence, partially wrong. The arguments are correct insofar as each leads to a determinable answer. The project-specific argument favors ratepayers and the systemic argument favors shareholders in cost allocation decision making. In the larger picture, however, both arguments are wrong because neither produces completely sound results. Decision makers have the discretion to choose either analysis as a justification for the result they wish to reach. No metadecisional rule exists that requires the decision maker to adopt one argument or the other. The project-specific/systemic dichotomy is simply another version of the mutually exclusive dualities inherent in regulatory analysis during this transitional period.

The accommodationist attitude exhibited by the state responses is a natural reaction to transition. Accommodation successfully attempts to make decisions without a solid theory because decisions must be made in the short-term. In a pluralistic democracy and in an activist state, the accommodationist response is understandable and legitimate, again in the short-term, precisely because decisions are made. The accommodationist response is inadequate in the long-term, however, because it is a response—an action—without a theory. The theory that does emerge from the transition must be based on the lessons of the transition; otherwise the accommodations go for naught. This decisional indeterminacy is constitutive of the breakdown of institutionalized policy during a period of dynamic change. The way to break out of nuclear policy indeterminacy is to move toward a more market-based rate making rather than a cost-based method.

C. *Federal Responses*

Federal authority over cost allocation is less pervasive than the power and authority exercised by state public utilities commissions, but it is nevertheless significant. Just as the states are not uniform in their treatment during the transition, federal regulators also are not of one mind. The nation responded to the TMI accident with appropriate caution. Old ways die hard, however, and the federal regulatory structure is no more anxious to change than any other institution. Specifically, the caution following TMI has given way to the federal regulatory "boosterism" reminiscent of earlier times. The judiciary, however, has been less uniform in its response to nuclear power. In fact, the judiciary,[170] specifically the

170. The United States Supreme Court has been particularly active in affecting nuclear decision-making power. Since Pacific Gas & Elec. v. State Energy Resources Conserv. & Dev. Comm'n, 461 U.S. 190 (1983), and Silkwood v. Kerr McGee Corp., 464 U.S. 238 (1984), signalled the decentralization of decision-making power, the Supreme Court also has decided three cases that recentralized power in the Nuclear Regulatory Commission by narrowing the scope of judicial review. In Metropolitan Edison Co. v. People Against Nuclear Energy, 460 U.S. 766 (1983), the Court reversed the District of Columbia Circuit's determination that the National Environmental Policy Act required the NRC to consider whether the TMI-1 restart would cause psychological damages. The Court allowed the NRC to limit the scope of its inquiry to make its task manageable, and then reinforced the principle of judicial deference to agencies. *Id.* at 776-79. Similarly, in another decision, the Court reversed the D.C. Circuit for failing to defer to the NRC's assessment of the environmental effects of the back end of the fuel cycle. Baltimore Gas & Elec. Co. v. Natural Resources Defense Council, Inc., 462 U.S. 87, 103-06 (1983). Finally, in Florida Power & Light Co. v. Lorion, 105 S. Ct. 1598 (1985), the Court resolved an appellate jurisdictional problem by eliminating a layer of review, thus streamlining the hearing process of citizen's petitions.

Metropolitan Edison, Baltimore Gas & Electric, and *Florida Power & Light* dealt with a common theme—the allocation of nuclear decision-making power in the federal system. In each of these cases, a conflict existed between the judiciary and the NRC. Such tension between courts and agencies as they engage in an institutional allocation of policy-making power is more or less constant. No single institution claims preeminence; nor can a set rule for power sharing be articulated with great precision. Instead, courts and agencies are involved in a dynamic role that recognizes the need for judicial deference to agencies and, simultaneously, the judiciary's oversight role.

In Bellotti v. United States Nuclear Regulatory Comm'n, 725 F.2d 1380 (D.C. Cir. 1983), the Massachusetts Attorney General sought to intervene in a Commission proceeding modifying Boston Edison's operating license for its Pilgrim nuclear power station. The NRC, however, felt that it had the authority to set the scope of its hearings and that the Attorney General had no right to intervene in the hearing. The United States Court of Appeals for the District of Columbia Circuit upheld the NRC decision. *Id.* at 1383.

Courts are not prone to abdicate all responsibility to the NRC, however. The same court that decided *Bellotti* ordered the NRC to hold a hearing under the same section of the Atomic Energy Act, to consider the results of emergency preparedness exercises. Union of Concerned Scientists v. United States Nuclear Regulatory Comm'n, 735 F.2d 1437, 1451 (D.C. Cir. 1984), *cert. denied,* 105 S. Ct. 815 (1985). No single factor accounts for when a court must defer. Sometimes courts give a "hard look" at agency actions, other times they merely give a "soft glance."

United States Supreme Court, is chiefly responsible for the decentralization of nuclear decision-making power.

Although several federal agencies[171] have responsibility for nuclear power regulation, the Nuclear Regulatory Commission, the Federal Energy Regulatory Commission, and the Department of Energy predominate. This Section highlights the federal developments during transition.

1. *The Department of Energy*

Of the three agencies, the Department of Energy has the least direct impact on the daily regulation of nuclear power. Instead, the DOE sets the tone for nuclear policy making in its role as informa-

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Between 1982 and 1985, circuit courts have deferred to federal nuclear agencies on issues such as rate base treatment of nuclear plant cancellations, Jersey Cent. Power & Light Co. v. Federal Energy Regulatory Comm'n, 730 F.2d 816 (D.C. Cir. 1984); NRC hearing procedures on decommissioning and waste storage, City of West Chicago v. Nuclear Regulatory Comm'n, 701 F.2d 632, 640-41 (7th Cir. 1983); pass-through of waste disposal costs to customers, Towns of Concord, Norwood & Wellesley v. Federal Energy Regulatory Comm'n, 729 F.2d 824, 830-31 (D.C. Cir. 1984); an NRC decision to take no enforcement action against Indian Point, County of Rockland v. Nuclear Regulatory Comm'n, 709 F.2d 766, 776 (2d Cir.), *cert. denied*, 464 U.S. 993 (1983); and the NRC's granting of operating licenses to the Diablo Canyon plant, San Luis Obispo Mothers for Peace v. Nuclear Regulatory Comm'n, 751 F.2d 1287, 1294 (D.C. Cir. 1984), *aff'd on reh'g*, 789 F.2d 26 (D.C. Cir. 1986) and the San Onofre plant, Carstens v. Nuclear Regulatory Comm'n, 742 F.2d 1546 (D.C. Cir. 1984), *cert. denied*, 105 S. Ct. 2675 (1985).

During the same period, however, circuit courts have not deferred to federal nuclear agencies. That lack of deference is reflected by decisions ordering the NRC to hold a hearing on the environmental qualification of certain safety-related equipment, Union of Concerned Scientists v. Nuclear Regulatory Comm'n, 711 F.2d 370, 381 (D.C. Cir. 1983); ordering the NRC to assess more thoroughly arrangements for medical services for contaminated persons, Guard v. Nuclear Regulatory Comm'n, 753 F.2d 1144, 1150 (D.C. Cir. 1985); rebuking the NRC for closing a meeting to public participation on the TMI-1 restart, Philadelphia Newspapers, Inc. v. Nuclear Regulatory Comm'n, 727 F.2d 1195, 1203-04 (D.C. Cir. 1984); rejecting the NRC rule eliminating electric utilities from demonstrating their financial qualifications, New England Coalition on Nuclear Pollution v. Nuclear Regulatory Comm'n, 727 F.2d 1127, 1130-31 (D.C. Cir. 1984); and remanding FERC's order refusing to allow pass-through of costs associated with permanent waste disposal when the basis for refusal was unclear, Carolina Power & Light Co. v. Federal Energy Regulatory Comm'n, 716 F.2d 52, 55-56 (D.C. Cir. 1983).

When considered together, these cases evince an unsettled attitude toward judicial deference to the expert agencies. Such an attitude is characteristic of post-TMI decentralized policy making. *See* Tomain, *Nuclear Regulation in Transition*, *supra* note 3.

171. *See generally*, W. Fox, *supra* note 13, at ch. 2 & Part IV.

tion gatherer for other government agencies.[172] The Department was born from an oil crisis. Because of the interdependent character of energy planning, the manner in which the DOE treats oil also affects nuclear power. The perception of energy scarcity meant that the country had to reduce its dependence on all oil, foreign as well as domestic. The government targeted power plants, together with large industrial oil consumers known as major fuel burning installations, for oil cutbacks.[173] As plants converted from oil and natural gas, they needed other fuels. Coal and nuclear were the obvious alternatives. Consequently, the DOE was predisposed to encourage the use of nuclear power as a way of relieving the pressure on oil use.

Although the Department has not advocated a financial bailout of the troubled industry, it has been an industry supporter. Under Energy Secretary Hodel, the DOE committed itself to ensuring that nuclear power continued to play an important role in securing America's energy future. The Department saw nuclear power as "critical" for a balanced energy mix, particularly because of its potential to displace oil.[174] To help reinvigorate the industry, the DOE supported licensing legislation designed to shorten the construction lead time and otherwise streamline the nuclear regulatory process as a means of reducing regulatory costs.[175]

Even though the DOE has taken a pro-nuclear position by keeping nuclear power in its energy plan, it has raised the industry's costs through waste disposal legislation. The Department administers the Nuclear Waste Policy Act of 1982[176] which imposes costs on utilities even though the costs can be passed through to consumers.[177]

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172. *See* Department of Energy Reorganization Act, 42 U.S.C. §§ 7133, 7135 (1982).

173. *See* Powerplant and Industrial Fuel Use Act, 42 U.S.C. §§ 8301-8484 (1982).

174. *See, e.g.*, U.S. DEP'T OF ENERGY, THE NATIONAL ENERGY POLICY PLAN (1983).

175. U.S. Dep't of Energy News Release (May 8, 1984). The DOE also has introduced legislation to streamline NRC regulatory procedures. Nuclear Licensing and Regulatory Reform Act of 1983, S. 894, 98th Cong., 1st Sess. (1983).

176. 42 U.S.C. §§ 10101-10226 (1982).

177. Title III of the Nuclear Waste Policy Act, 42 U.S.C. § 10222 (1982), establishes a Nuclear Waste Fund that civilian power reactors fund at the rate of one mil per kilowatt hour. These costs are passed on to ratepayers. Towns of Concord, Norwood & Wellesley v. Federal Energy Regulatory Comm'n, 729 F.2d 824, 825 (D.C. Cir. 1984); Iowa Elec. Light &

2. Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission has direct authority over allocating cancellation costs for jurisdictional sales. FERC, through Part II of the Federal Power Act, exercises regulatory, including rate-making, jurisdiction over interstate purchases of electricity for resale.[178] Like the majority of states, FERC has adopted an accommodationist policy to cancellation expenses by splitting costs between ratepayers and shareholders[179] and by apportioning responsibility for nuclear projects among participants.[180] The Commission also helps utilities with cash flow by allowing construction work in progress in the rate base. FERC has adopted a rule which allows partial recovery of construction work in progress. All construction work in progress for pollution control facilities and fuel conversion facilities may be given rate base treatment, as may fifty percent of any other construction work in progress allocable to electric power sales for resale.[181]

3. The Nuclear Regulatory Commission

The NRC has no formal rate-making authority. As the central policy-making bureau, however, its rules and regulations directly affect the costs of plant construction. The post-TMI period has been especially turbulent for the NRC, so much so that the agency's viability, as presently constituted, is seriously questioned.

Power Co., [State Transfer Binder 1983-1985] Util. L. Rep. (CCH) ¶ 24,347, at 57,720 (Iowa Commerce Comm'n Mar. 26, 1984).

178. 16 U.S.C. §§ 824-824K (1982). The Federal Energy Regulatory Commission has rate-setting power over interstate wholesale sales of electricity, which is estimated to be 29% of all electricity sales. *See* CBO STUDY, *supra* note 37, at 3. If utilities perceive federal regulators to be more favorable than state regulators, the federal regulatory role may increase as utilities establish subsidiaries or holding companies for interstate sales of electricity. Under the doctrine of preemption, federal regulation of electricity supercedes state regulation. *See* Nantahala Power & Light Co. v. Thornburg, 106 S. Ct. 2349, 2356-57 (1986).

179. New England Power Co., [Federal New Matters Current] Util. L. Rep. (CCH) ¶ 13,005 (FERC Apr. 11, 1985), *aff'd*, [Federal New Matters Current] Util. L. Rep. (CCH) ¶ 13,064 (FERC July 24, 1985).

180. Middle S. Energy, Inc., [Federal New Matters Current] Util. L. Rep. (CCH) ¶ 13,021, at 18,998 (FERC 1985).

181. Mid-Tex Elec. Co-op, Inc. v. Federal Energy Regulatory Comm'n, 773 F.2d 327, 345-47 (D.C. Cir. 1985); 18 C.F.R. § 35.26 (1984); 48 Fed. Reg. 24,323-358 (1983).

Both the Kemeny[182] and Rogovin[183] Commissions criticized the agency for its preoccupation with licensing and its inattentiveness to safety. Both recommended that the agency be reconstituted.

The NRC's immediate response to TMI was similar to everyone else's—it became alarmed and began to tighten safety requirements. Both utilities and the Commission took safety inspections more seriously. In addition, the NRC stepped up the number and amount of fines.[184] Another costly post-TMI regulation was the NRC's adoption of emergency preparedness rules.[185] Prior to TMI, the NRC required utilities to submit on-site emergency plans. Although off-site emergency planning was discussed before TMI,[186] the need for such planning did not become apparent until shortly after the accident when Pennsylvania Governor Thornburgh advised pregnant women and pre-school children to evacuate the area within a five-mile radius of TMI. The NRC and the Federal Emergency Management Agency issued a document providing guidelines for state and local governments and nuclear facilities for developing emergency response plans.[187] The NRC adopted final rules in the summer of 1980 stating that it will not issue an operating license until it finds that reasonable assurance exists that adequate protective measures can and will be taken in the event of radiological emergency.[188] Emergency preparedness requirements have been costly, particularly to the Shoreham plant, which began construc-

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182. PRESIDENT'S COMMISSION ON THE ACCIDENT AT THREE MILE ISLAND, THE NEED FOR CHANGE: THE LEGACY OF TMI 51-56, 61-67 (1979).

183. M. ROGOVIN, THREE MILE ISLAND: A REPORT TO THE COMMISSIONERS AND THE PUBLIC (1979).

184. From 1973 to 1983, the number of fines increased from about five to 55 and were reduced to about 22 in 1984. During these same periods, the amount of fines rose from $100,000 to more than $4 million during the years 1973 to 1983, and receded to about $1.5 million in 1984. Data compiled from IE ENFORCEMENT STAFF, ENFORCEMENT ACTIONS: SIGNIFICANT ACTIONS RESOLVED NUREG: 0940 (1985) (copies on file with authors).

185. Irwin, State and Federal Roles in Emergency Planning (Sept. 21, 1984) (copy on file with authors). This paper was delivered at the American Law Institute-American Bar Association seminar on Atomic Energy Licensing and Regulation, October 1984.

186. NUCLEAR REGULATORY COMMISSION, PLANNING BASIS FOR THE DEVELOPMENT OF STATE AND LOCAL GOVERNMENT RADIOLOGICAL EMERGENCY RESPONSE PLANS IN SUPPORT OF LIGHT WATER NUCLEAR POWER PLANTS (1973).

187. NUCLEAR REGULATORY COMMISSION, CRITERIA FOR PREPARATION AND EVALUATION OF RADIOLOGICAL EMERGENCY RESPONSE PLANS AND PREPAREDNESS IN SUPPORT OF NUCLEAR POWER PLANTS (1980).

188. *See* 10 C.F.R. §§ 50.33, .47, .54, Part 50, App. E (1984).

tion prior to the TMI incident. The NRC retroactively applied these rules to Shoreham and, together with faulty emergency generators, they are chiefly responsible for Shoreham not being on-line after nearly twenty years.[189]

The NRC's enthusiasm for emergency planning has waned, however. In two instances, the Commission attempted to circumvent its own regulations and was checked by federal courts.[190] In other areas the NRC has issued proposed decommissioning rules which would require utilities to make available $100 million for the decommissioning of each plant.[191] The Commission has also proposed revisions to its back-fitting rules that may raise costs.[192]

During the transition, complacency has not been the watchword at the NRC. Indeed, quite the opposite is true. Still, the NRC is caught in the position of encouraging the safe development of nuclear power while shedding its promotional image and continuing to license plants. Stepped-up safety inspections, increased fines and penalties, costly back-fitting, emergency preparedness, and decommissioning regulations reflect the NRC's activist intervention into the construction and licensing processes. This intervention is costly, however, and has caused turmoil in the industry. The industry's instinctive reaction has been to attempt to minimize regulatory costs. In response to critics who chided the NRC for its prolonged regulatory lag, the NRC undertook a major internal re-

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189. Long Island Lighting Co. v. County of Suffolk, 628 F. Supp. 654, 656-59 (E.D.N.Y. 1986).

190. The NRC adopted a rule that the Atomic Safety Licensing Board need not consider the results of emergency preparedness exercises in its licensing hearings. This rule had the effect of denying a hearing on emergency preparedness which, according to the Commission's own regulations, is material to issuance of a license. The reviewing court ordered the NRC to conduct a hearing consistent with the Atomic Energy Act. Union of Concerned Scientists v. Nuclear Regulatory Comm'n, 735 F.2d 1437, 1438 (D.C. Cir. 1984). In another case, the NRC sought to avoid following its own regulation regarding "arrangements for medical services." The court held that the NRC's interpretation of the rule—that the response plan merely list existing facilities—was insufficent. Guard v. Nuclear Regulatory Comm'n, 753 F.2d 1144, 1149 (D.C. Cir. 1985).

191. 50 Fed. Reg. 5,600, 5,602 (proposed Feb. 11, 1985).

192. 10 C.F.R. § 50.109 (1985); *see also* the divergent replies to the proposed rules. 50 Fed. Reg. 38,097, 38,101-02 (1985).

view by establishing the Regulatory Reform Task Force in 1981. The Task Force issued a draft report on November 3, 1982.[193]

The draft report reflects the various pressures brought to bear on the NRC to tighten the regulatory process in order to reduce costs and step up licensing. Not surprisingly, the reactions to the draft report can be aligned neatly, with utilities and industry interests opposed to intervenors and individual interests. These reactions reveal the predicament that faces the NRC. In an effort to follow its congressional mandate, and in reaction to the change in public attitudes, the NRC increased its regulations with the direct effect of raising costs to the industry. To offset rising regulatory costs, the NRC attempted to tighten regulations. As a consequence, the Task Force's suggestions lessen public participation in the regulatory process.[194]

State and federal regulation of nuclear power since TMI has been anything but uniform. Power and authority has been decentralized between federal and state governments. Within the federal government, indications point to power being recentralized. With the heightened public sensitivity to safety issues after Chernobyl and the promulgation of a series of safety-conscious rules, however, the recentralization effort has a long way to go. Furthermore, within the states, decision makers are not resolving uniformly the problems surrounding plant cancellations. The lack of uniformity is characteristic of a developmental period.

The transition lacks uniformity because of the many competing dualities. In fact, the traditional regulatory approach no longer works. As the country looks to the future, however, it still must solve the problems of the past. Although some may argue reasonably that regulating utilities now according to a post-industrial competitive market standard would be unfair because the recent regulatory scheme encourages utilities to invest in nuclear power, the fact remains that overinvestment has occurred. In addition, imposing the risks on ratepayers who had no hand in making investment decisions is equally unfair. Accommodation, then, may be a tempo-

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193. NUCLEAR REGULATORY COMMISSION REGULATORY REFORM TASK FORCE, DRAFT REPORT (November 1982); *see also* Green, *Licensing Reform*, in AMERICAN LAW INSTITUTE/AMERICAN BAR ASSOCIATION, ATOMIC ENERGY LICENSING AND REGULATION (1985).

194. Nuclear Regulatory Commission Regulatory Reform Task Force, *supra* note 193; *see also* UNION OF CONCERNED SCIENTISTS, *supra* note 4, at ch. 3.

rary necessity, but it need not become a regulatory way of life. Otherwise, past theory will guide future action when the underlying facts do not conform theory and action. The transitional period is the time to critique past theory, understand changes in present circumstances, and design future policy.

IV. Analysis of Nuclear Transition: Toward Post-Industrial Regulation

A. *Introduction*

To this point, this Article has described the nuclear market, its failure, and the decisions allocating the costs of mistaken nuclear investment. Today, the country finds itself at the end of a transition characterized by uncertainty of policy, diversity of decisions, and lack of cohesive theory, as demonstrated by a series of mutually exclusive dualities. Most cancellation decisions have been made, few plants remain to be brought on line, and the economy is rebounding. Electric utilities, nuclear and non-nuclear, are recovering their financial health. America now has the experience and the time for reassessing its commitment to, and regulation of, large-scale, long lead-time, high technology power plants.

Analysis of the various dualities reveals the existence of three regulatory models—the Traditional Model, the Transitional Model, and the Post-Industrial Model. Given nuclear market failure and the unsatisfactory regulatory responses under the Traditional Model, a choice favoring the Post-Industrial Model becomes clear. Slowing demand for electricity, excess capacity, rising nuclear costs, co- and self-generation, declining or reversing economies of scale, decentralized decision making, and slowing and problematical technological improvements in the nuclear industry indicate the emergence of a more competitive market for nuclear power. Utilities, such as Pacific Gas and Electric, seeking rate decreases and giving preferential treatment to large consumers corroborates the presence of competition.[195] Finally, a more competitive environment also is confirmed by the actions of public utilities

195. *See, e.g., P.G.&E. Seeks to Cut Rates Average of 12%*, Wall St. J., Mar. 21, 1986, at 4, col. 3; *Pacific Gas & Electric asked the California Public Utilities Commission for permission to reduce by an average of 12% the rates it charges its customers*, Wall St. J., Apr. 9, 1986, at 47, col 4.

commissions that have attempted to reformulate rate making to conform to a more market based system.[196]

B. Regulatory Models

Figure 1 outlines the characteristics of the three regulatory models used in this Article.

Figure 1

Models of Nuclear Policy and Regulation

	TRADITIONAL	TRANSITIONAL	POST-INDUSTRIAL
Dates	1946-1979	1979-1986	1986-
Energy supply	High technology, Large scale	Mixed	Competitive, Alternative sources
Plant Construction	Capital expansive	Stalled, Cancelled	Scaled down, Standardized
Decision-making authority	Centralized, Federal	Dualistic, Federal/State	Decentralized Federal/State/ Local
Bureaucratic model	Elitist, Expert	Adversarial, Contentious	Democratic
Decision-making fora	Agencies, (NRC, public utilities commissions, DOE)	Courts	Community-based bargaining (e.g., Negotiation, Mediation)
Rate making	Rate base	Accommodationist	Market-based, Deregulation
Public Participation	Circumscribed	Contentious, Factious	Participatory
Policy support	Uniform	Diffuse	Pluralistic

196. *See supra* note 120 and accompanying text.

The models should now be familiar. The Traditional Model, promoting nuclear power, defines the hard energy path.[197] It conceives of energy supply as large scale, high technology, capital expansive, and necessary for both industrial and economic growth and social well-being. The characteristic regulatory structure of this model is government sponsored, elitist, specialized, centralized, and technocratic, with little need for public participation. Public participation is viewed as inefficient and ineffective.[198] Instead, expert federal

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197. A. LOVINS, *supra* note 30, at 26-28.

198. *See, e.g.*, Green, *Public Participation in Nuclear Power Plant Licensing: The Great Delusion*, 15 WM. & MARY L. REV. 503 (1974). In assessing current NRC reform proposals, Professor Green does not see any increase in effective public participation:

> Eleven years ago I wrote that public participation is at best a charade and at worst a sham. Nothing has happened in the intervening years to change my views. Public participation gives ordinary citizens and citizen groups the opportunity to retain counsel, employ nuclear experts, and become parties in adversarial, quasi-judicial hearings. The concept of public participation evolved after the fact to characterize and rationalize the phenomenon that numerous intervenors availed themselves of a statutory right to a hearing in licensing proceedings in order to harass, impede, and hopefully obstruct specific nuclear power projects. It was not a case of Congress or AEC/NRC saying "let there be public participation" and then providing adversary hearings to achieve this objective. Quite to the contrary, the nuclear power establishment blundered its way into public participation which, on its face, is a "motherhood" issue that is generally regarded as politically infeasible to eliminate.
>
> Public participation masks a more fundamental malaise. Intervenors expend their money, energy, emotions, and time in contesting nuclear power projects in adversary hearings only because they lack confidence in the government regulators. They stubbornly refuse to accept as adequately safe what the regulators certify as adequately safe. They assume the responsibility for doing the job they believe the regulators are not doing. And because their intervention overtly attacks the integrity of the regulatory process, the regulators must fight back to defend themselves, only further convincing the intervenors and their friends that the regulators are incompetent, untrustworthy, and in cahoots with the industry they are supposed to regulate. The entire structure is like a self-destructing perpetual motion machine.
>
> Moreover, the intervenors can accomplish very little, if anything. Their resources—financial and technical—are only an infinitesimally small fraction of those available to the applicant and the NRC. They simply do not have the competence to make any real contribution to greater safety. To exacerbate the problem, the NRC's procedures are carefully rigged to let the intervenors blow off steam while at the same time curbing their ability to achieve their objectives. The result is frustration, alienation and suspicion which only serves to exacerbate the political woes of nuclear power.

Green, *supra* note 193, at 240-41 (footnote omitted); *see also* P. NAVARRO, *supra* note 99, at 105-07.

administrative agencies are the primary decision makers. The economic incentive structure comes in the form of direct government support through legislation that gives private industry access to nuclear materials,[199] invests in research and development,[200] and limits the financial exposure of participants in the nuclear venture.[201] The Traditional Model creates a nuclear market that would not otherwise exist. Because government wanted technological improvement, industry wanted profits, and the consuming public wanted cheap energy, the market created by this model had legitimacy. The nuclear market is an artificial construct, however, and is susceptible to destabilization when political and economic structures change. This destabilization has occurred as the financial market ceases investing and as public support decreases, thus eroding the legitimacy of the Traditional Model.[202]

The Transitional Model is less a model than a state of temporary destabilization. Although energy supply continues during this period, the traditional sources of supply are questioned, resulting in the delay and cancellation of nuclear plants. The commitment to large-scale, high technology plants is on hold, particularly as the energy supply is supplemented by co-generation, self-generation, and alternative sources. Decision making is decentralizing, moving from the federal to the state governments. Courts are increasingly second-guessing and overturning or delaying agency actions.[203] This court activity evinces a breakdown in political support as not only intervenors, but shareholders, utilities, contractors, vendors, architects, and engineers seek judicial relief from the financial consequences of nuclear market failure.[204] It also demonstrates dissat-

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199. 42 U.S.C. § 2073 (1982).

200. 42 U.S.C. § 2051 (1982).

201. 42 U.S.C. § 2210 (1982).

202. *See* J. CAMILLERI, THE STATE AND NUCLEAR POWER: CONFLICT AND CONTROL IN THE WESTERN WORLD 107-32, 274-93 (1984).

203. One commentator has been critical of courts that second-guess nuclear policy decisions. *See* Yellin, *High Technology and the Courts: Nuclear Power and the Need for Institutional Reform*, 94 HARV. L. REV. 489 (1981).

204. As recently as 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 PLI, NUCLEAR LITIGATION 203 (1979). Today, utilities are bringing multi-million dollar lawsuits against architects, engineers, reactor vendors, and construction contractors. Heiden, *Construction Litigation In-*

isfaction with elitist bureaucratic decision making. If the public voice is not heard at the agency, then the court is another forum.

During the transition, society is also questioning the pro-nuclear incentive structure. Many view government subsidy of the industry as dangerous to health and safety, and the traditional rate-making formula as inadequate to handle the allocation of plant cancellation costs. The result is a series of regulatory accommodations imposing losses among consumers, shareholders, and taxpayers. The accommodationist response is built on cost allocation decisions that do not honor uniformly the connection between policy-making responsibility and financial liablity.[205]

Just as the shift toward decentralized decision making from agencies to courts and from the federal government to the state legislatures is evidence of political change, a corresponding economic change also emerges as the rising price of electricity from large scale plants encounters increased competition. The artifice of the nuclear market is exposed by the substitution of electricity from other suppliers, thus replacing the state-created nuclear market with a less regulated, more competitive market.

The Post-Industrial Model relies on electricity supplied from several sources. Central power stations no longer serve as the preeminent supplier. For nuclear power, this fact means that scaled-down, standardized plants rather than megaplants stand a better chance of competing against other suppliers.[206] No uniform pro-nuclear policy exists. Instead, nuclear policy is factious, even between industry and government.[207] The public is suspicious of plant safety, knows that nuclear power is not cheap, and realizes

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volving Nuclear Power Plants, in PLI, NUCLEAR LITIGATION 307 (1984). Shareholders are suing managers for breach of fiduciary duty, *see* Rubin v. Dickhoner, No. C-1-83-1721 (S.D. Ohio, filed Feb. 21, 1984) (certified for class action, Apr. 15, 1985) and customers are suing utilities to prevent cost pass-through, County of Suffolk v. Long Island Lighting Co., 554 F. Supp. 339 (E.D.N.Y. 1983).

205. Tomain, *Law and Policy in the Activist State*, *supra* note 3, at 212-34.

206. *See* Tanguy, *Safety and Nuclear Power Plant Standardization: The French Experience*, PUB. UTIL. FORT., Oct. 31, 1985, at 20, 25.

207. Government most likely will raise the cost of doing nuclear business through increasing industry exposure under the Price-Anderson Act, *see Price-Anderson Act Amendment Act of 1985, Hearing before the Subcomm. on Energy Research and Development of the Senate Comm. on Energy and Natural Resources*, 99th Cong., 1st Sess. (1985), and through more costly regulations, as discussed in section III-C of this Article, *supra* notes 170-94 and accompanying text.

that safety and finances present real tradeoffs.[208] The bureaucratic mode of decision making is democratic and participatory, rather than technocratic and elitist.[209] This reformulation of the role of agencies does not mean that experts have no place in administrative decision making. Rather, experts gather and interpret positive scientific data, and politically accountable decision makers make policy recognizing that normative uncertainty pervades nuclear decision making.[210] Decision making will continue to be decentralized between the states and the federal government, and among the states. Correlative with the change in bureaucratic thinking is a move toward a wider range of dispute resolution alternatives. In addition to courts and agencies, community-based and interest-based bargaining will take place, utilizing negotiation, mediation, and arbitration as viable alternatives to litigation and administrative hearings.[211] Finally, the nuclear market in the Post-Industrial Model is both more competitive and less state-supported than either of the other models. Although the state will continue to monitor safety, it will not subsidize financial matters.

These three models describe the characteristics of regulatory periods. A closer examination of the Transitional Model reveals the contours of future nuclear law and policy.

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208. *See, e.g., Nuclear Agency Calls Cost Pinch a Possible Factor in Ohio Reactor Accident*, N.Y. Times, July 23, 1985, at B16, col. 1; *Safety Rules and Laxity Cited as Driving up Reactor Costs*, N.Y. Times, Feb. 27, 1984, at A1, col. 3.

209. *See* D. YATES, BUREAUCRATIC DEMOCRACY: THE SEARCH FOR DEMOCRACY AND EFFICIENCY IN AMERICAN GOVERNMENT 113 (1982) ("I offer a simple theoretical proposition: the more inclusive the participation in bureaucratic segments, and the more competitive their environment, the more closely the bureaucracy will conform to the norms of pluralist democracy.").

210. Nuclear decision making is both positive and normative as well as economic and political. Because it has these attributes, the use of nondemocratic, bureaucratic decision making is misplaced. *See* W. LOWRANCE, OF ACCEPTABLE RISK: SCIENCE AND THE DETERMINATION OF SAFETY 102-126 (1976); C. PERROW, NORMAL ACCIDENTS: LIVING WITH HIGH-RISK TECHNOLOGIES 15-61, 304-352 (1984).

211. *See, e.g.*, NATIONAL INSTITUTE FOR DISPUTE RESOLUTION, REGULATORY NEGOTIATION ISSUE (January 1986); Harter, *Negotiating Regulations: A Cure for Malaise*, 71 GEO. L.J. 1, 7 (1982); Petrulis, *NRRI Report: Commissions Use Negotiated Settlements to Expedite Regulatory Process*, 6 NRRI Q. BULL. 379 (Oct. 1985).

C. Transitional Dualities

The nuclear transition was discontinuous as it moved from one period—or model—to another. The series of dualities mentioned throughout this Article represent the discontinuities present during transition. These dualities, without being forced, do not align themselves perfectly with either the Traditional Model or the Post-Industrial Model during this period. Instead, the dualities exist as justifications for the use of decision makers in their decision making. The dualities, listed in Figure 2, serve the heuristic purpose of exposing the rhetorical devices and argumentative strategies used by decision makers.

Figure 2

Transitional Dualities

	Traditional Model	Post-Industrial Model
Goals and Objectives	Long-term Efficiency Economic Growth	Short-term Equity Political participation
Bureaucratic model	Managerial	Democratic
Argumentative perspectives	Ex ante Quantitative	Ex post Nonquantitative
Constituency	Shareholder	Consumers
Public Participation	Mechanistic	Pervasive
Cost allocation		
perspective	Systemic	Project-specific
justification	Service obligation	Market risk distribution
test	Prudent management	Used and useful

Although Figure 2 aligns the dualities, the alignment is forced. The Traditional Model, for example, favors long-term efficiency and market mimicking as ways to maximize wealth and economic growth. During the transition, however, the Traditional ideology, which supports the continuance of large central power stations, must achieve its ends through short-term financial fixes and loss allocation based on ex post argumentation. Similarly, proponents of the Post-Industrial ideology, who favor short-term equity, avail themselves of long-term efficiency arguments during the transition. Both postures mix ideological elements. Such mixing is consistent with a radically changing market structure, a lack of well-developed theory, and transitional decision making.

Pure versions of the Traditional and Post-Industrial Models would align the dualities as they are described in Figure 2. The Traditional Model would treat nuclear policy from an ex ante perspective and would formulate a long-term, systemic, nuclear program in order to maximize efficiency and economic growth. The Traditional Model would consist of elite bureaucratic decision making with minimal public participation and would justify shareholder protection as a means to wealth-maximizing ends. Likewise, the Post-Industrial Model would attempt to create a policy motivated by political participation, and would concern itself with short-term, project-specific decentralized decision making. Equity would serve as the decisional rule for the ex post protection of consumers—those persons in the worst position to protect themselves.

The transitional dualities betray a lack of theory for cost allocation, indicate a change in direction for nuclear policy, and expose the values missing from the Traditional Model to reveal the configuration of the Post-Industrial Model. The dualities suggest a critique of the Traditional Model and present an opportunity to reconstruct a more responsive regulatory approach. This backward-forward examination of nuclear law and policy should prove sturdy enough to suggest regulatory reforms if the future reforms emanate from past practices, thus providing stability between regulatory regimes.

Developing a list of concrete reform proposals is both easier and harder than might be suspected. Inventing specific reforms proves easy because they are limitless.[212] Dealing with specific reforms,

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212. Specific examples of reform at the federal level would include: abolishing the NRC; creating an independent safety body; establishing a separate licensing agency with a separate appeals board or eliminating administrative appeals; relying on "hard look" judicial review; repealing the Price-Anderson Act; and creating a federal Office of Public Advocate that would provide expertise and funding for intervenors. At the state level, concrete reforms would include restructuring the rate-making formula to avoid cost-plus pricing; extending legislative ventures into the nonradiological side of nuclear regulation; funding in-

however, is hard because a forty-year-old mind-set[213] favoring nuclear power and a century of large scale electricity regulation must be broken. Explicitly identifying and articulating the fundamental values of the transition thus becomes necessary. Simply put, nuclear power is stalled because the regulatory system cut itself off from the market and was not sensitive to politics. Until one addresses these issues at a normative level, no reform effort will work.

The Traditional Model broke down because it curtailed participation and attenuated responsibility in decision making. Nuclear policy during this period unwisely depended on a market of its own creation and on highly centralized decision making. Such dependence aggravated the disparity between policy-making responsibility and financial liability. Furthermore, the artificial nuclear market and the transitional relief that decision makers provided through a series of accommodations distorted normal market risks and contained inefficient incentives. Recognizing the underlying values of participation, decentralization, competition, and responsibility is imperative for sound regulatory reform.

The nation can begin to ascertain the regulatory future by taking the following steps: aligning the mutually exclusive dualities; describing their consistencies; generating sets of reforms; deciding on a way of choosing between sets; choosing between sets; then, designing concrete reforms consistent with the chosen set. The evaluative test for choosing between opportunity sets is responsive-

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tervenors; and encouraging interstate and state-federal participation in such issues as waste disposal, nuclear transportation, and emergency planning. These proposals, standing alone, are not novel and are easily generated. They also are consistent with the critique because they are based on increased participation and increased decentralization aimed at a closer alignment of responsibility and liability. As such, they coincide with the Post-Industrial Model.

One also can fashion an alternative set of reforms, consistent with the Traditional Model. At the federal level, Traditional Model reforms would include streamlining licensing as per the Task Force report; renewing Price-Anderson; circumscribing public participation; supporting standardization financially; and promoting the development of a national power grid. At the state level, reforms would encompass continuing the use of cost-based rate making; giving greater judicial deference to public utilities commissions; lowering the standard for prudency findings; eliminating proxy advocates; and increasing the expertise of public utilities commissions by appointing commissioners and expanding technical staff.

213. *See* Union of Concerned Scientists, *supra* note 4, at ch. 6; Maleson, *The Historical Roots of the Legal System's Response to Nuclear Power*, 55 S. Cal. L. Rev. 597, 610 (1982).

ness: Does the chosen reform or set of reforms respond to the critique? If the choice is wisely made, then legitimacy follows.

The opportunity sets are clear. Bluntly put, the choice is between the Traditional Model of elitist, technocratic, nuclear regulation and the Post-Industrial Model of participatory, decentralized regulation. These models are mutually exclusive ways of looking at the world. They are regulatory ideologies. The Traditional Model is a vision of an end-state where nuclear power necessarily plays a part of our energy future. The Post-Industrial Model is a state of second best. Because more than one energy policy will compete for the nation's attention, nuclear power may or may not be part of the post-industrial world. Nuclear power may play a role if political and market circumstances are such that politically responsive and accountable decision makers choose nuclear energy through democratic participatory processes. Nuclear power could reemerge if industrial growth demands it, or, what is more likely, if smaller and more standardized plants become cheaper to build than coal plants.

Policy options under the Post-Industrial Model reflect tensions between politics and markets, power and money, and equity and efficiency. The competing policies are given voice through decision-making processes that require participation before legitimacy attaches. The outcome and future depend less on a vision of the best end-state than on a decision-making and policy-making process that yields a realignment of responsibility and liability through responsive regulation. If nuclear power reemerges, the reemergence will be the result of public choice, not of industry-government edict.

V. Conclusion

During the transition, regulatory agencies provided relief to the nuclear industry, improving the utilities' cash flow and apportioning investment losses among ratepayers, shareholders, and taxpayers. This relief was not economically defensible. It was inefficient because it encouraged overinvestment and sent wrong signals about risks and incentives. It also protected, at least partially, poor investment and poor managerial choices, encouraged waste, and allocated risks to persons—ratepayers—in the worst position to protect themselves.

The transition, however, should be politically understandable as a period of regulatory shakeout. Regulators were forced to confront drastic market changes, institutionalized pro-nuclear and pro-large scale electricity policies, anachronistic rate-making methodologies, and dramatic shifts in regulatory politics. They also confronted a fundamental question: Should the country maintain its century-long commitment to large-scale, high technology plants as the preeminent source of electricity? The transition disclosed the complexities of this question and helped begin to formulate an answer. The transition serves as a bridge between two models and an opportunity for policy development. It activated the dynamic part of bureaucratic government during which corrective action takes place, thus relegitimizing policy choices. Even when the transition was rough, it released the fetters of a past, and here, mistaken, policy that has been institutionalized by law.[214]

The implication of legal transition for the interaction of law and policy is that an allegiance to unitary or end-state policy positions is unnecessary and unwise. Instead, one should recognize that a policy-making process, and the role and rule of law in that process, are constitutive of a policy that attempts to mediate conflict and give voice to varied interests rather than dominance to some.[215] Mediation of competing claims through the political process becomes the hallmark of legitimate policy making and decision making in the modern state.[216] Democratic and pluralistic participation in policy making is accorded priority as both economic and political values co-exist and compete.

The inescapable consequence of the interaction of law and policy is that political values are implicated in the regulatory order. It can be no other way. The legitimacy of the regulatory state depends on acceptability and accountability. As long as decision makers maintain their accountability to their various constituencies and the public accepts their decisions, stability results. Still, destablizing events can occur. The rejection of a promotional nu-

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214. Tomain, *supra* note 9, at 722-23.

215. *See generally* A. HIRSCHMAN, EXIT, VOICE, AND LOYALTY (1970) (discussion of a manner of analyzing social processes that illuminates a wide range of economic and political issues).

216. *See* A. WILDAVSKY, SPEAKING TRUTH TO POWER: THE ART AND CRAFT OF POLICY ANALYSIS 114-40 (1979).

clear power policy by financial markets in the mid-1970s, and the disenchantment of the general public after TMI, are prime examples of such events. Destabilization, however, need not be permanent and the country need not experience a continuous legitimation crisis as long as a transition can occur during which reforms develop that are responsive to the public's assessment of the destabilizing events and to its critique of past policy.

The primary lesson of the nuclear transition is that radical changes in politics and markets produced a series of mismatches in nuclear policy making. The mismatches were accommodated, not cured, through regulatory and judicial compromises. Although they are not held together by a coherent economic model or a clear policy reference, the accommodations represent a temporary "balancing" of interests. The transitional balancing allows the legal/policymaking system to shake out regulatory discontinuities and allows policy paradigms to transform and reconstruct. The existence, purpose, and effect of the Transitional Model is consistent with government in a pluralistic democracy and is consistent with the traditional liberal theory of law and politics as applied in the activist bureaucratic state.[217] The Transitional Model provided a critique of Traditional regulation and a preview of Post-Industrial regulation. Whether the country will travel the path responsive to the critique remains to be seen.

217. B. ACKERMAN, RECONSTRUCTING AMERICAN LAW 1-6 (1984); G. ALPEROVITZ & J. FAUX, REBUILDING AMERICA 173-91, 257-71 (1st ed. 1984); B. BARBER, STRONG DEMOCRACY: PARTICIPATORY POLITICS FOR A NEW AGE 261-312 (1984); W. GORMLEY, *supra* note 128, at 181-218; D. YATES, *supra* note 208, at 180-205; Tomain, *Constructing a Way Out of the Liberal Predicament* (Book Review) 1985 A.B.F. RES. J. 345, 356-57; *see also* Macneil, *Bureaucracy, Liberalism and Community—American Style*, 79 NW. U.L. REV. 900, 947-48 (1984-85); Stewart, *Regulation in a Liberal State: The Role of Non-Commodity Values*, 92 YALE L.J. 1537, 1538-39 (1983).

APPENDIX

Regulatory and Judicial Treatment of Nuclear Plant Cancellation Costs

STATE	DECISION	CITATION	DATE	PLANT	U. REQ.
AZ	Arizona Public Service Comm'n	38 PUR4th 547	80	Palo Verde 1	20,079,000
CA	San Diego Gas & Electric Co.	31 PUR4th 435	79	Sundesert	90,300,000
CA	Southern Ca. Edison Co.	50 PUR4th 317	82	Vidal	
CT	Ct. Light & Power Co.	Nos. 810602, 810604	81		All costs
CT	United Illuminating Co.	55 PUR4th 252	83	Pilgrim II	14,700,719
CT	United Illuminating Co.	64 PUR4th 319	84	Seabrook 2 / Pilgrim II	18,700,000 annually for 10 yrs/4,889,640
DC	Potomac Electric Power Co.	29 PUR4th 517	79	Douglas Point	54,240,000
DC	Ananheim v. FERC	669 F.2d 799	81	Vidal/ Huntington Beach	0/547,000
DC	Jersey Central Power & Light Co. v. FERC	730 F.2d 816	84	Forked River	397,000,000
FL	Gulf Power Co.	43 PUR4th 15, aff'd, GPC v. Cresse, 410 So.2d 492 (1982)	81	Caryville	10,768,052 (Unamortized balance)
ID	WA Water Power Co.	65 PUR4th 100	85	Skagit/Hanford	3,565,000 per year for 5 years
IL	Union Electric Co.	53 PUR4th 565	83	Callaway II	Total: 46,600,000 (5,070,000 from IL ratepayers)
IN	Citizen's Action Coalition v. NIPSCO	485 N.E.2d 610	85	Bailley N-1	190,746,580
IO	Iowa Power & Light Co.	51 PUR4th 405	83	Vandalia	
MA	Commonwealth Electric Co.	47 PUR4th 229	82	Montague I + II/Pilgrim II	1,466,000 / 7,581,000

AMT. ALLOW	AMT. DIS.	RATE BASE	OPER. EXP.	ROR (%)	AMORT. PER.	COST C/E (%)
0	All costs denied	Denied	Denied	8.75	0	15
84,540,000	AFUDC excluded (5,100,000)	Unamortized balance denied	84,540,000 (Direct costs)	10.59	5	14.5
			Costs as OE denied	12.65		16
	No recovery after Comm'n determines project "ill advised"					
7,350,359 (annually)	0	Denied	Direct costs allowed	13.16	2	16.4
14,700,000 annually/ 3,667,230	Unamortized balance denied	Denied	Direct costs allowed/Full amt. allowed	14.37	10	
30,000,000	Denied land held for future use	Unamortized balance denied	Direct costs allowed	9.03	10	12.75
0/547,000			Vidal disallowed as OE / HB allowed			12.75
	Unamortized balance denied	Unamortized balance denied	Direct costs allowed	12.62	15	19
10,768,052 (Unamortized balance)	0	Unamortized balance allowed (10,768,052)	Direct costs denied		5	
4,623,000 total (50/50 split SHs + RPs)	Costs after Dec. 31, 1981 denied (11,154,000)	Denied	Direct costs allowed (4,623,000)	12.097	15	14.9
663,000 for test year	All uncertain costs denied	Denied	All direct costs allowed (including carrying costs)	11.9	5	15.5
0	All costs denied	Denied	Denied		0	
0	All costs denied	Denied	Denied	10.88	0	15
1,351,000/ 5,307,000	Equity AFUDC denied/No recovery after 7/80	Denied/Denied	Direct costs allowed/same	11.91	3.2	15.5

STATE	DECISION	CITATION	DATE	PLANT	U. REQ.
MA	Boston Edison Co.	46 PUR4th 431	82	Pilgrim II	278,300,000
MA	Fitchburg Gas + Electric Light Co.	52 PUR4th 197	83	Montague I + II /Pilgrim II	196,443/ 906,641 (Costs to 7/1/80)
ME	Bangor Hydro Electric	46 PUR4th 503	82	NEPCO units	354,408 (Annually)
ME	Central Maine Power Co.	57 PUR4th 488	83	Pilgrim II	14,500,000 (9,661,238 direct costs; 4,851,762
ME	ME Public Service Co.	67 PUR4th 101	85	Seabrook 2	11,200,000
MI	IN & MI Electric Co.	Case N. U-6148	81	Breed Project	11,433,077
MI	Detroit Edison Co.	52 PUR4th 318	83	Greenwood II + III	71,000,000 (19,000,000 in AFUDC)
MN	Northern States Power	46 PUR4th 110, aff'd 690 F.2d 674 (8th Cir. 1982)	81	Tyrone Energy Park	75,000,000 (35 mill. in costs; 40 mill. in unset. Ks)
MN	Northern States Power	42 PUR4th 339	81	Tyrone/Sherco 4	10,928,000 (test year request)/800,000
MO	Union Electric Co.	57 PUR4th 169	83	Callaway II	84,000,000 (22 mill. in costs; 10 mill. AFUDC; 52 mill. in K
MO	Kansas City Power & Light Co.	EO-85-185, EO-85-224, ¶ 25,036	86	Wolf Creek	194,700,000
MT	Pacific Power & Light Co.	53 PUR4th 24	83	Pebble Springs /WPPSS V	970,000 / 1,055,000
NC	Carolina Power & Light Co.	49 PUR4th 188	82	Harris Units III + IV	53,748,000
NC	Duke Power Co.	49 PUR4th 483	82	Perkins	5,119,000
NC	Carolina Power & Light Co.	55 PUR4th 582	83	Harris III + IV	

AMT.ALLOW	AMT. DIS.	RATE BASE	OPER. EXP.	ROR (%)	AMORT. PER.	COST C/E (%)
82,100,000	74,200,000 (Eq. AFUDC + exp after July 1, 1980) denied	Denied	12,700,000 (cost of service recovered with ROR of 14%)	10.94	13	
175,056/ 536,770	All equity AFUDC denied (21,387)/ same (55,781)	Denied/Denied	Direct costs allowed (Costs of Service)/Same	13.68	3	16.3
282,456 (Annually)	All equity AFUDC denied (71,952)	Denied	Direct costs allowed (282,456)	13.71	5	16.4
0	All costs denied	Denied	Denied			
Prudent costs allowed (5,644,451)		Unamortized balance allowed	Direct costs allowed		3.6	16.5
	All costs denied	Denied	Denied	9.93	0	13.5
		Deferred to decision U-6949			10	
40,000,000 plus settled K claims	Unsettled K claims denied	Denied	Direct costs allowed		5	
0/800,000	All costs denied for Tyrone	Denied for both plants	Denied for test year/Sherco costs allowed	9.73	0.3	13.5
decision deferred	decision deferred		Costs denied			
78,200,000	126,000,000 (due to imprudent management)	78,200,000 allowed in yearly percentage increases		11.75	7	15
0	All costs denied	Denied			0	
Direct costs allowed		Long term debt of unamort. balance allowed (2,655,000)		11.57	10	14.5
5,119,000		Unamortized balance denied	Direct costs allowed	11.98	5	15.5
Prudently invested costs allowed		Unamortized balance denied	Direct costs allowed	11.38	10	

STATE	DECISION	CITATION	DATE	PLANT	U. REQ.
NH	Public Service Comm'n of NH	60 PUR4th 17	84	Pilgrim II	15,926,729
NJ	Jersey Central Power & Light	44 PUR4th 54	81	Forked River Project	413,700,000
NJ	Utility Construction Plans: Hope Creek II	No. 8012-914	82	Hope Creek II	
NJ	Atlantic City Electric Co.	51 PUR4th 109	83	Hope Creek II	
NY	Rochester Gas & Electric Co.	45 PUR4th 386	82	Sterling	All costs except interest charges
NY	Central Hudson Gas & Electric Co.	67 PUR4th 459	85	Sterling	
OH	Toledo Edison Co.	42 PUR4th 568	81	Davis Besse II +III, Erie I + II	
OH	Toldeo Edison Co.	46 PUR4th 589	82	Davis Besse II + III (Common property)	6,996,000
OH	Cleveland Electric Illuminating Co.	46 PUR4th 63	82	Davis Besse II + III, Erie I + II	56,437,000 (amt. remaining from 1980 case)
OH	Dayton Power & Light Co.	45 PUR4th 549	82	Killen Unit I	
OR	Pacific Power & Light Co.	49 PUR4th 82	82	Pebble Springs/ WPPSS V	48,994,000/ 60,596,000
PA	PA Pub. Util. Comm'n. v. Duquesne Light	52 PUR4th 644, aff'g 51 PUR4th 198	83	Davis Besse II + III, Erie I + II	34,697,389
PA	PA Electric Co. v. PA Pub. Util. Comm'n.	502 A.2d 130	85	TMI I/TMI II	
SD	Black Hills Power & Light Co.	46 PUR4th 391	82	Osage	
TX	Houston Lighting & Power Co.	50 PUR4th 157	82	Allen Creek I + II	361,100,000

AMT. ALLOW	AMT. DIS.	RATE BASE	OPER. EXP.	ROR (%)	AMORT. PER.	COST C/E (%)
none	All costs denied	Option of ROR increase				
225,389,000	AFUDC after plant cancelled denied	Unamortized balance denied	Direct costs allowed	10.68	15	15
172,185,000		Unamortized balance denied	Allowed		15	16
Direct expenses allowed		Unamortized balance denied	Allowed	11.7	15	15
38,600,000 (prudently incurred costs)	Amounts allocated to other utilities	Carrying charges allowed on unamort. balance			5	
Direct costs allowed			Direct costs allowed	12.84	5	15.7
	24,553,550	Unamortized balance denied (24,553,550)	Denied	11.44		
0	All costs denied	Denied	Denied	13.09	0	17.86
Allowed 1981-1982 amortization amt.	After 1982, amortized amt. denied	Option to increase ROR	Disallowed (after OCC v. OH PUC)	12.25	15	17.3
0	All costs denied		Denied	12.11	0	16.44
Decision delayed	Decision delayed			12.54		17.07
One yr. amortization period allowed (3,469,739)		Unamortized balance denied	Direct costs allowed	11.64	10	16.14
0	All costs denied	Denied			0	
All costs allowed		Unamortized balance denied		11.12	5	14.5
195,000,000	Denied costs after Jan. 1, 1980 (166,000,000)	Unamortized balance denied	Direct costs allowed	12.63	10	16.85

STATE	DECISION	CITATION	DATE	PLANT	U. REQ.
VA	VA Electric & Power Co.	29 PUR4th 65	79	Surry III + IV	60,348,000 (4,548,000 AFUDC)
VA	VA Electric & Power Co.	44 PUR4th 46	81	North Anna IV	
VA	VA Electric & Power Co.	48 PUR4th 327	82	Surry III + IV + North Anna IV	
VA	VA Electric & Power Co.	54 PUR4th 1	83	Surry III + IV/ North Anna IV	50,000 per year/ 68,000 per year
VT	Central Vt. Pub. Serv. Corp.	49 PUR4th 372	82	Pilgrim II	8,200,000 total (2,531,000 AFUDC 5,669,000 dir.
WA	WA. Util. & Transp. Comm'n. v. Pacific Power & Light	51 PUR4th 158	83	Pebble Springs/ WPPSS V	10,594,000
WA	WA Util. + Transp. Comm'n. v. Puget Sound Power & Light	54 PUR4th 480	83	Pebble Springs	
WA	People's Org. Wash. Energy Res. v. SWUTC	679 P.2d 922	84	WPPSS III	20,174,000
WA	WA Util. + Transp. Comm'n. v. Puget Sound Power & Light	62 PUR4th 557	84	Skagit/Hanford	178,136,875
WI	Wis. Public Serv. Comm'n.	52 PUR4th 389	83	Koshkonong	
WY	Pacific Pwr. & Light v. Public Service Comm'n.	677 P.2d 799	84	WPN 4,5/ Pebble Springs	

AMT. ALLOW	AMT. DIS.	RATE BASE	OPER. EXP.	ROR (%)	AMORT. PER.	COST C/E (%)
Direct costs allowed (No AFUDC)	Denied 9,743,000 + all AFUDC	Unamortized balance denied (26,831)	Allowed	9.63	10	13.5
All costs (including AFUDC)		Unamortized balance denied	Allowed	10.68	10	15
Allow recovery of senior equity		Unamortized balance denied	Direct costs allowed	15		15.5
Direct costs		Unamortized balance denied for both plants	Direct costs allowed	10.92	10	16.25
1 yr. amort. period allowed (820,000)		Unamortized balance denied	Direct costs allowed	12.53	10	16
		Option to add 2.5% to ROR	Denied	13.01	0	18.5
4,749,000 (for test year)	All AFUDC denied after March 12, 1980	Unamortized balance denied (47,546,000)	Direct costs allowed	12.63	10	16.25
0	All costs denied	Denied	Denied		0	
Costs before June, 1980 adjusted: 81,750,284	Costs after June, 1980 including AFUDC: 49,572,069	Unamortized balance denied	Direct costs allowed	12.74	10	16.25
530,400 (for test year)			Allowed	11.09	1	15
0	All costs denied	Denied	Denied			