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Paul W. MacAvoy and Jean W. Rosenthal: Corporate Profit and Nuclear Safety

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Strategic Challenge at Northeast Utilities

IN THE EARLY 1980s Northeast Utilities was one of the country's leading electric generating and distributing companies, with a reputation not only for service but also for technological leadership at its nuclear plant operations, including those at the Millstone site. By 1996, Northeast's Millstone nuclear facilities were shut down by the Nuclear Regulatory Commission, requiring the utility to incur extraordinary expenses for repairs, staff retraining, and replacement power. The state utility regulatory agency denied the company the opportunity to recover these costs from customers and, as a result, Northeast's stock price collapsed. Its reputation as a technological leader in power generation was destroyed, as management pled guilty to twenty-five felony charges brought against its operations of the nuclear facilities. By the end of the 1990s, the company had its assets up for sale to independent wholesale power producers and other retail distributors, in effect seeking to disappear from the electric power scene.

What happened in ten short years to bring about the destruction of this company? There are conflicting answers, many of which were voiced in public hearings and court proceedings in the aftermath of the shut-down. The company's defenders argued that it could not respond to abrupt and arbitrary changes in nuclear safety regulation at a time when it was responding to newly competitive markets for its products and services. Part of this explanation is that an unfortunate series of operational accidents in the nuclear plants contributed to its downfall. As its regulated markets were becoming subject to deregulation, costs of production would become a central issue in maintaining Northeast's position in New England. The company cut costs, then stated it was surprised by plant accidents. This strategy's increased risk, said to be limited, turned out to be realized not because of excessive cost cutting but just bad luck.

This explanation, however, is not the only answer to the question as to why the company collapsed. An opposing theory is that management, dedicated to a competitive strategy designed to deal with regulatory change, made decisions to contain costs that deliberately took on extreme risk of safety-related violations of nuclear regulatory standards. They did this to sustain implementation of a "cost dominance" strategy to achieve the company's immediate targeted positions of substantial

growth of revenues and earnings. This “enhanced risk” theory posits that the destruction of Northeast was *strategic*: cost containment necessarily interacted with nuclear plant operations to take on enhanced risk, including that of regulatory shutdown, which then occurred, but not before the goals had been achieved to enhance the earnings of those in charge.

Why did management depart from the company’s best interest in responding to such risk? When this trade-off is viewed from a management perspective, bonuses and stock awards tied to current earnings do not reflect potential additional costs in the future. The only current costs of the strategy to management were those associated with the increasing pressure inherent in complaints of the Nuclear Regulatory Commission. From the point of view of management if not the company, these potential returns of continuing cost containment could be “worth” the risk of degraded nuclear safety.

An Overview of Strategy and Performance at Northeast Utilities

From its inception Northeast had a challenging mandate in delivering electricity to industrial, commercial, and residential customers. Its retail services were regulated by state public utility control agencies in Massachusetts and Connecticut under certificates allowing exclusive operation in its distribution regions. As a regulated monopoly, its tariffs of charges and conditions of sale were approved by these agencies when found to be “just and reasonable;” the company had the opportunity, but not the guarantee, to operate profitably in a growing market as long as it did not exceed allowed levels of “just and reasonable” profit. Its second and equal challenge consisted of conforming to nuclear-power-plant safety requirements in operating licenses granted by the Nuclear Regulatory Commission. The commission determined that plants were “safe and reliable” when operated according to certified design, based on frequent inspections and reviews of plant equipment, staff, and system operations.

Within this framework of price and safety regulation, the company, according to its charter, was intended to generate allowed and achievable earnings for its investors. Prices were fixed, based on a predesignated rate of return on capital, but if costs could be reduced below expected levels and if demand were to increase beyond forecast levels, then earnings could go higher. That is, senior management had the responsibility to generate and distribute electricity at prices set by state regulators, while conforming to plant safety regulations, and providing investors with the highest (constrained) return possible on their capital. The board of directors of the company, termed at Northeast the Board of Trustees, had the responsibility to appoint, monitor, and evaluate management on

these aspects of performance and ultimately on the achievement of investor returns that perpetuated the company.

It was within this framework that Northeast Utilities developed a new strategy to attain a competitive advantage in sales of electricity in New England in the mid-1980s. Located in industrialized areas of southern New England, with more than half its capacity in advanced nuclear generation plants, Northeast Utilities' prospects for growth in both sales revenues and total profitability depended critically on maintaining its position as the dominant power supplier in a growing regional market. A major shift, however, was expected to take place in the regulatory mandates facing management and the board of directors. At some point in the future, deregulation of entry and price control in generation markets would open them to competitive sources of electricity. Bulk power of other generating companies was expected to be brought into southern New England over common transmission lines, even over Northeast's own transmission lines. To respond to this "competitive threat," Northeast management adopted a new strategy in the mid-1980s, with the goal that Northeast would become the low-cost provider in its service region, not only to retain but also to expand its share of electricity markets.

In 1984 Northeast electricity sales increased by 3.9 percent, net income by 46.5 percent and, earnings by 34.7 percent.¹ The company's nuclear generating units had achieved a composite operating rate of 78 percent of capacity, comparable to that of the leading nuclear generating companies nationwide. In 1986, Northeast completed construction of its most technologically advanced nuclear facility, the 1,150-megawatt Millstone Three, and placed that plant in commercial service with a first-year capacity factor of 84 percent.² This high-level performance led to enhanced earnings and historically high stock-price levels; looking ahead, Northeast expected to sustain these capacity factors to increase sales and earnings significantly without adding to existing plants for the next twenty years.³

A little over a decade later, Northeast Utilities was in operational and financial shambles. The Nuclear Regulatory Commission had shut down the three Millstone nuclear plants, with the requirement that hundreds of millions of dollars had to be invested in renovation before they would be allowed to restart. The shutdown had followed regulatory commission, employee, and media accusations of corporate failure to manage these facilities safely.⁴

Operationally, the forced Millstone shutdowns ended the company's history of profitable performance. Northeast had to purchase electricity to replace that of the shut-in nuclear plants, rebuild these plants to meet stringent restart requirements, and recruit or retrain plant operators who could pass new competency tests of the safety regulatory agency. The

result was an increase in costs in nuclear operations that eliminated company-wide earnings. The Northeast common stock share price in 1996 fell to 20 percent of the 1986 level.⁵

Northeast Utilities' nuclear operations were taken apart and reassembled because of the NRC shutdown. The oldest of the three shut-in nuclear plants, Millstone One, was not reopened but instead began the long and costly process of decommissioning, ensuring that it would never again generate either energy or income. The newest of the plants, Millstone Three, reopened after twenty-six months of extensive reconstruction, while Millstone Two opened after an even longer period. Under the decisions of the Connecticut Department of Public Utility Control, the restructuring costs were not passed through for recovery in utility rates, nor were the costs for replacement power; both were absorbed as losses by investors.

The Northeast losses not only were operational and financial but also included destruction of the organization that had existed in the early 1980s. The United States Attorney for the District of Connecticut undertook an investigation that led to charging Northeast Utilities with criminal violations of regulations in nuclear operations. Northeast Utilities pleaded guilty in 1999 to twenty-five felony violations of environmental and safety regulations at its Millstone power plants between 1994 and 1996 and paid a fine of \$10 million. Of the total, \$5 million was related directly to nuclear operations, the largest fine in the history of the Nuclear Regulatory Commission's regulation of commercial nuclear power facilities.⁶

In December 1999, Consolidated Edison of New York made an offer to acquire Northeast, which, when completed, would have provided Northeast shareholders with cash and stock. The merger offer put a negative value on the Northeast nuclear generation assets, given that the value of the assets to be acquired was \$131 million more if the nuclear assets were excluded. The merger offer was withdrawn early in 2001, after Con Ed refused to accept the risk of Northeast's fixed-price contracts for future power deliveries.⁷ An auction of the Millstone plants was announced in April 2000 and completed the following July; the successful bidder for the relicensed plants opened Millstone Two and Millstone Three under new strategies and management. Northeast continued as a retail distribution and transmission company, eventually eliminating all its nuclear- and fossil-generating operations.⁸

Given that "performance" is measured in returns to shareholders in the long run in perpetuation of the enterprise, these results were catastrophic. Northeast had gone from being a profitable producer and distributor of electric power to a local retailer that distributed power purchased from others. Its destruction of shareholder value made the company a target for takeover; but with the collapse of its sale to Con Ed, it was an independent enterprise only because its contracts made it uneconomic to purchase.

This outcome of Northeast's strategic approach is not as catastrophic as, for example, a destructive accident at a reactor would have been. As the NRC made clear after Three Mile Island, however, safety as defined for operators of nuclear facilities is not an all-or-none proposition. While no level of spending could totally remove the risk of a nuclear shutdown accident, spending had to be extensive enough to make the plant operate without "frequent" or "serial" forced shutdowns from malfunction. That level of spending was inherent in meeting NRC high-grade requirements in its inspection and review process. NRC complaints made it clear that Northeast took on excessive risk by operating outside its parameters for plant spending, which the NRC took as the foundation for safe operations.

In examining management decisions, it is useful to conceive of them as sequential decisions unfolding over time (i.e., a simple "decision tree"). In 1986–87, Northeast management and the board considered alternatives and made an initial choice of a strategy that was the first "yes" branch of the tree. At a point four years later, the effects of implementation of that strategy become clear, and the choice of which branch to proceed on was the choice to continue or abandon the strategy. Given regulatory agency objection to continuing the strategy, the choice was either to continue or to return to pre-strategy levels of investment in maintenance in the Millstone plants.

Did this company make decisions to continue, and thus follow the "enhanced risk" theory? If so, for what purpose? The response to these questions is the subject of the chapters that follow. Chapter 2 develops the Northeast competitive strategy of the latter half of the 1980s. We evaluate this strategy against alternatives available in its regulatory environment. Chapter 3 provides a narrative on the implementation of that strategy and introduces the emerging conflict between that strategy and nuclear plant safety in operations, as defined by the Nuclear Regulatory Commission and industry self-regulation standards. It then describes the severe setbacks in operational and safety performance from forced outage in the Millstone nuclear plants in 1990 and 1991. These required Northeast to make basic decisions on backtracking strategy, as the NRC openly questioned the safety and reliability of Millstone plant operations. If the company abandoned implementation of the strategy, then costs would increase, but nuclear plant performance would likely improve. If Northeast still pressed hard to achieve strategic cost containment, then nuclear plant performance would not likely improve. The narrative does not make clear which path was taken at that point, because of complexities caused by the acquisition of another nuclear plant, as part of the overall competitive strategy. Interactions with the Nuclear Regulatory Commission related to the acquisition caused the company to increase operations and maintenance expenditures of all its nuclear plants.

Chapter 4 describes cost containment in the first half of the 1990s, with enhancements required for NRC approval of the new plant acquisition. Signals coming from the commission increased to the effect that the Millstone plants would be put on the “Watch List” for regulatory shutdown unless there were improvements in plant performance. Chapter 5 describes extensive forced outages at Millstone in 1995 and 1996, and then, with all three plants down, the NRC orders that prevented Northeast from restarting the plants. In the end, increasingly frequent operational problems, carried over from previous years, increased the likelihood that the regulatory agency would impose shutdown. When the opportunity arose for the NRC to decree that the plants could not reopen without extensive evaluations and additional investment, then it did so. Northeast’s failure, at that point, was caused by forced outages that by chance had all three plants down at once.

But this performance itself requires an explanation. Underlying it is the failure to modify or cancel the corporate strategy. To be sure, that strategy was “adjusted” somewhat in response to increasingly negative reactions from utility regulators, plant employees, and ultimately the safety regulator. Adjustment, however, was not abandonment; the strategy was still the priority of management, even as the company was warned of an imminent shutdown at Millstone. In accord with the “ordinary” theory, in seeking to maintain “halfway” strategy, management operational behavior was still at odds with regulatory standards; in accord with “enhanced risk” theory, management took on more risk by ignoring the NRC to achieve full cost containment for its own sake.

One of these explanations must be correct. There is no evidence of incompetence. Management and the board of directors were able to manage a complex three-reactor facility under extremely high levels of regulatory control and achieve a high level of plant security; it had done so at a more difficult time of initial plant operations in the 1980s. Either management and a passive board of directors maintained what they thought was a moderate risk strategy, or else they maintained a high-risk strategy, for good reason. We test the “enhanced risk” hypothesis to the effect that it was to management’s specific advantage to go as far as it did in the face-off. The test of this theory appears in chapter 5. We find that the system of rewards for management focused on year-ahead corporate earnings, which were substantially unaffected by increasing risk of a Millstone shutdown in the future. The result was that the increases in risk-to-reward ratio for the company facing shutdown constituted only limited changes adverse to a management that focused on next year’s sales and earnings performance.⁹ The strategy that was actually put into effect had more risk of shutdown but was not adverse to management until the last few months of its ten-year duration.