



World Nuclear Association Annual Symposium
8-10 September 2004 - London

Nuclear Power Plant and Corporate Financial Performance In a Liberalized Electric Energy Environment

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Liberalization in the United States, frequently referred to as deregulation or restructuring, has been fundamentally good for investors in nuclear power plants.

For investors who wanted to get out of the business of owning and operating nuclear plants, liberalization has provided an exit path.

For investors who see advantages in owning and operating nuclear power plants, liberalization has provided these investors the opportunity to expand their investments in nuclear plants.

As a result of sales made possible by liberalization, nuclear power plant ownership in the US is today more concentrated and these sold nuclear plants are now owned in business environments which provide sustainable benefit improvements to investors when plant operations are improved. Absent further liberalization, this desirable trend will likely be slow at best, requiring carefully crafted sales efforts in states that have not liberalized.

In summary: those states which have liberalized their electric energy markets have created an environment in which nuclear plant investment is attractive. This is in sharp contrast to cost of service rate regulation and its variations which existed in those states prior to liberalization and still exists in many states. The new business environment provided by liberalization is an essential step toward investment in new nuclear plants in the US.

This paper will:

1. Summarize the ownership changes that have occurred and are pending in US nuclear plants and their relationship to individual state liberalization.
2. Discuss why liberalization is key to the plant sales.
3. Compare selected financial performance of sellers and buyers of nuclear plants.

4. Compare selected plant performance measures before and after the ownership changes; and
5. Conclude with a discussion of the implications for attracting investment in new nuclear power plants.

Individual state liberalization and nuclear power plant ownership changes in the United States

The US map in *Figure 1* shows the status of plant sales and state liberalization. The various symbols show sales of plants, plants that have been part of corporate mergers or ownership consolidation of plants that have had multiple owners, plants that are part of an expanded fleet ownership based on purchase of other plants, and finally, plants for which their ownership is essentially unchanged. The colours show the status of liberalization.

The most immediate impression is the strong correlation between the liberalized states and nuclear plant sales, mergers and consolidations. Altogether there have been majority interest ownership changes in 16 plants during the last six years. Most of these occurred in the period 1999-2001. There have been additional consolidations in ownership either as a result of mergers of the owning companies or within the owners of a single plant.

Figure 2 shows the relationship between timing of state liberalization and plant sales in that state. With the exception of Vermont, all the transactions have occurred only after state liberalization.

The strong correlation between advent of liberalization in an individual state followed by nuclear plant sales in that state is no coincidence. This correlation is driven by powerful business imperatives related to the inherent disadvantages of cost of service rate regulation.

Why is liberalization so important in fostering the sale of nuclear plants?

Liberalization laws in the individual states have provided the framework for sale transactions that provide a package of payment for the plant and purchase power agreement. This combination allows sellers to exit their nuclear investment with no loss of book value and the buyers to have a new business environment that does not have the inherent disadvantages of cost of service rate regulation.

The inherent disadvantages of cost of service rate regulation deserve discussion such that the value and importance of liberalization can be fully appreciated.

Typically, book values of nuclear power plants have been above their market values. This difference is commonly referred to as “stranded investment”. Sellers who have wanted to exit their nuclear businesses have been faced with choosing between losing the stranded investment, or being forced to continue to own and operate the plant. The typical reaction has been to continue to own and operate.

Continued ownership and operation in cost of service rate regulation, however, continues to subject the owner to the inherent disadvantages of cost of service rate regulation.

There are many variations in cost of service rate regulation, e.g. historical vs. future test years, fuel adjustment clauses, performance bands and incentive ratemaking to name some of the more common. All, however, have in common two basic principles:

1. Recovery of prudently incurred operating costs, and
2. Earnings for the owner based on the remaining book value of the plant.

The prudently incurred costs and authorized return for the investors are determined in periodic rate cases administered by state authorities.

While this system on its surface appears reasonable, perhaps even advantageous, it is inherently disadvantageous for investment in a nuclear power plant with its large operating expense and above average financial operating risk.

The first disadvantage of this system is that the rate setting process focuses on average risk and average return to the investor which is simply inconsistent with the above average risk represented by the nuclear plant. The low fuel costs and high operating costs of a nuclear plant with significant regulation from the Federal government pose a completely different risk profile for the company compared to the relatively higher fuel costs and lower operating costs represented by coal and gas power plants. The difference in risk profile is particularly significant in states that allow fuel costs to be directly passed through to customers.

The second disadvantage is that the earnings provided to investors steadily decline as the book value of the plant declines over its regulated life. The decline in book value and decline in earnings is inherent in the cost of service rate regulation process. As the earnings decline, the financial operating risk, the potential for increases in nuclear operating costs, continues unabated. Even though the rate setting process is intended to allow recovery of prudently incurred operating expenses, the process may involve regulatory lag in allowing recovery of the expenses, or may involve public policy input on what is or is not prudent that is not consistent with the operating realities of the power plant. Increasingly the investor is confronted with the reality that their earnings will decline to zero while the above average potential will continue for their operating expenses to negatively impact their earnings.

It is this combination of declining contribution to earnings and above average financial operating risk that makes cost of service rate regulation a major disadvantage for investment in nuclear power plants.

Liberalization provides the opportunity for new investment with its mechanisms for allowing:

1. The seller to recover their book value, and
2. The buyer to recapitalize at a price that provides the right risk/reward balance

In essence, liberalization allows the new owner to benefit, in a sustainable manner, from their efforts and initiatives to improve their business.

Nuclear investors in states that have not liberalized have in large part been denied these opportunities. Of the nuclear plants in states that have not liberalized, only one has been sold, the Vermont Yankee plant in Vermont. Notably, it was a process that took longer, involved above average difficulty and was subject to considerable controversy. A second effort, the sale of Kewaunee in Wisconsin, is currently under consideration.

Evaluating the financial performance of sellers and buyers of nuclear power plants

There are numerous techniques for evaluating the financial performance of a company. For the purposes of this paper, the relative performance of the company's stock price compared to the S&P 500 Utilities was used. The intent of using relative stock prices was to provide some correction for broad industry trends that might generally be influencing overall stock prices. A nuclear plant sale or purchase is by no means the only thing that may influence a company's stock price and in fact may be only a minor factor compared to other factors such as company mergers and acquisitions. However, taken in aggregate, the relative stock price performance is considered a valid indicator.

Experience of nuclear power plants sellers

Given the inherent difficulties of cost of service rate regulation and the inherent above average demands on nuclear power plant owner/operator management, it is no surprise that given the opportunity, most owners in liberalized states have chosen to sell.

Even for companies that may have felt up to the continuing challenge of nuclear power plant ownership and operation, many have felt obligated to sell their plants. The reason for this is that a common aspect of liberalization in many states was that a sale transaction was needed to implement the stranded cost recovery mechanisms. Basically, the old owner was not able to take advantage of the "new deal" available to a buyer, so in many cases plant sale was the best option.

Sellers typically went through three steps:

1. Announce intent to sell
2. Announce agreement with a prospective buyer
3. Closure of the deal

From start to finish the process typically took one to two years, although a few were accomplished in shorter or longer time frames. Sellers included both investor owned utilities and state government entities.

Figure 3a shows the relative change in stock value of sellers. On average, the relative stock price of sellers compared to the S&P 500 Utilities index:

1. Declined 1% from the time of announcement of intent to sell to announcement of an agreement,

2. **Increased 9%** from the time of announcement of intent to sell to closure of the deal, and
3. **Increased 27%** from the time of announcement of intent to sell to one year after deal closure.

The averages are based on the experience of seven sellers for eleven power plants. While these represent the majority of seller transactions, not all sale transactions are represented in the list due in two cases to the unavailability of data and in three cases the seller not having publicly traded shares.

Figures 3b, c, d, e, f and g provide detailed charts of the relative performance of the stock of these seven sellers relative to the S&P 500 Utilities index. Relative stock price performance both during the sales and subsequently has varied widely. Notable are the relatively indifferent stock price reactions in the case of Boston Edison (*figure 3b*) and Rochester Gas & Electric (*figure 3e*) and the clear strengthening shown by Consolidated Edison (*figure 3c*), Illinova (*figure 3d*), Niagara Mohawk (*figure 3f*) and Northeast Utilities (*figure 3h*). Only Duquesne (*figure 3g*) has shown a clear downward trend. Boston Edison, Illinova and Niagara Mohawk were all merged with or acquired by other companies shortly after the closures of their nuclear plant sales.

Credit rating reactions to the sales were all positive either in the form of rating upgrades, positive indications or affirmation of existing ratings.

The sellers have expressed no regrets at their divestitures.

Experience of nuclear plant buyers

The new business opportunity presented by sale of a plant outside cost of service rate regulation has been taken advantage of by five companies. These are Florida Power and Light, Constellation, Dominion, Exelon and Entergy. Three of these companies, Constellation, Dominion and Exelon experienced restructuring in their native states. Exelon and Entergy have distinguished themselves by the relatively larger number of plants they have purchased.

Figure 4a shows the relative change in stock value of these buyers. On average, the relative stock price of buyers compared to the S&P 500 Utilities index:

1. **Increased 21%** from the time of announcement of an agreement to the time of deal closure, and
2. **Increased 60%** from the time of announcement of an agreement to deal closure plus one year.

These increases represent a significant increase in buyer stock value relative to the S&P 500 Utility index.

These averages are based on five buyers of fourteen power plants.

Figures 4b, c, d, e and f provide detailed charts of the relative performance of the stock of these five buyers relative to the S&P 500 Utilities index. Most remarkable are the charts for Exelon (*figure 4e*), formerly PECO prior to its

merger with the major nuclear owner operator Unicom, and Entergy (*figure 4f*). Both show tremendous growth in their relative stock price, over 140%, subsequent to their purchase of additional nuclear assets. PECO/Exelon is interesting in that its acquisitions were all prior to the merger through a subsidiary, Amergen, jointly owned by PECO and British Energy. Since the merger with Unicom to form Exelon, there have been no further acquisitions by Exelon except for the acquisition of the balance of the interest in Amergen from British Energy. The relative stock performance of the other three buyers has also been positive, although not as dramatic as for Exelon and Entergy.

Credit rating agency reviews of buyers were generally negative although have become more cautious in suggesting that a nuclear acquisition strategy can be manageable if carried out by the right company, e.g. a company with the experience and demonstrated capability for managing nuclear assets. While there were no specific credit rating downgrades associated with a nuclear plant purchase, several purchases were accompanied by “negative outlook” or “Creditwatch negative” announcements.

Not surprising, the buyers have expressed no regrets at their acquisitions. The favorable results to the new investors have not been coincidental. They have been based on solid business fundamentals that can be understood by every employee.

These business fundamentals, controlling costs and improving production, have found a proper home in a liberalized business environment. They are finally being allowed to provide sustainable benefits for investors. The favorable impact on investors of these fundamentals is a refreshing change compared to the prior years in cost of service rate regulation when increasing production and reducing costs were for the primary benefit of customers while increasing risk of negative earnings for investors. Given this new environment, it is appropriate to look at how the plants have performed after being sold.

Plant performance before and after ownership changes

Whether plants are operating better after a sale is a fair question. Both good and poor performing nuclear plants have been sold. To gain insight, the operational performance was examined of sixteen plants that have been sold. The performance of those plants was examined by three separate measures as reported to WANO:

1. Capability factor,
2. Unplanned capability loss factor, and
3. Forced loss rate

For each plant, performance was examined in a five year period which consisted of the two years prior to the year of sale (year -2 and -1), the year of sale (year 0), and two years after the year of sale (year 1 and 2). To account for generally rising industry performance over the last half dozen years, the performance was adjusted each year for the industry’s improvement that year.

The improvements in performance relative to industry averages are shown in *figures 5a, b and c*. The results are impressive. They show a clear improvement

in performance in the two years after sale as compared to the two years before. In all cases the average performance improved either exceeding or coming close to industry average performance with the greatest improvement taking place in the worst performers.

There are explanations unique to each plant; however, they fall generally into two categories.

The first category is that the plant was a recognized poor performer with room to improve at the time it was sold. Its poor performance and impact on its owner may have been a factor in the decision for it to be sold. The new owner simply reaped the improvement opportunity provided.

The second category is that the buyer, with its commitment to expansion and refinement of its nuclear operating capability, was able to make improvements that simply eluded the more dispersed management efforts of the prior owner.

The ability to improve capability factor can have significant financial consequences to a new plant owner. By way of illustration, a one percentage point capability factor increase for a 600 MWe plant in a market where electricity is selling for \$35/MWhr can mean an increase in electric production with a revenue impact of \$1.8M. A twenty percentage point increase as suggested in figure 5a represents a \$36M increase in revenues. In a liberalized environment where the owner can take this benefit to their corporate bottom line, this can be a significant contribution to earnings. In a pre-liberalized cost of service rate environment, this benefit would be for customers with no benefit to investors.

The explanation for each plant will involve a combination of reasons from both categories that make the details of each plant performance improvement a unique story for that plant.

Changes in operating costs were not examined here primarily due to the increasing difficulty in accumulating reliable operating cost information. However, anecdotal information suggests that better management of costs has also been an important part of the success story for buyers.

Summary of plant operational and corporate financial performance before and after plant sales

The results of this analysis suggest three broad conclusions:

1. Plant sales have broadly contributed to improved stock prices for sellers and even more so for buyers. This suggests that investors appreciate that nuclear ownership and operation is a management niche or specialty. And that the broad trends of nuclear industry consolidation are favorable for both those who are divesting minority assets within their company and for those who are accumulating nuclear assets to be part of a management strategy.
2. Credit rating agencies have not changed credit ratings of companies based on either their sale or purchase of a nuclear plant. In the case of sales,

rating agencies have generally regarded the sale favorably, but almost always as part of recognition of a larger corporate strategy to streamline or focus the company's lines of business. In the case of purchases, rating agencies have generally regarded the credit impact as neutral to somewhat negative with some positive references, commonly giving credit to the operational or management capabilities of the company and that the addition of the asset further reduces risk of individual nuclear plant assets already owned. What appears to be most important is for a company to acknowledge whether it is owning/operating a business in which it has at best a peripheral interest or whether it is expanding a segment of its business which it has identified as a core competency.

3. Operational performance has improved at plants after they have been sold. This is contrary to the view held by some that putting nuclear power plants in business environments that connected returns to investors with performance of the plants without the protection of cost of service rate regulation would result in degraded performance due to corner cutting and short sighted management strategies. The opposite appears to be the case.

Implications for attracting investment in new nuclear power plants

What does the US experience over the last six years suggest for new nuclear investment?

Those jurisdictions that have discarded cost of service rate regulation in exchange for a liberalized business environment have opened the door for new nuclear investment. The willingness to buy existing nuclear power plants, the operational improvements in those plants in the new business environments and the corresponding benefit to the new investors is strong evidence of this view.

Whether the investor interest in existing nuclear plants in liberalized markets will extend to investment in new nuclear plants in liberalized markets will depend strongly upon the competitiveness of new designs and to a lesser degree upon other factors. Ultimately the competitiveness of new, or existing, reactor designs will depend upon such external factors as long term fossil fuel costs and environmental issues.

But the experience to-date strongly suggests that given the opportunity provided by a liberalized business environment, nuclear power plants can and do attract investment and provide investment returns commensurate with real or perceived nuclear financial operating risk.

In conclusion, the business environments established by the liberalized states for their electric energy markets provide the hope and opportunity for investment in new nuclear plants. Compared to the declining value environment inherent in cost of service rate regulation that has been the historical business environment for nuclear power plants, liberalization has been and will be the foundation of any nuclear renaissance.

Acknowledgement:

The author is pleased to recognize the significant research and analysis contributions made by Mr. Brett Behling of Alliant Energy and Mr. Michael Fairchild of Nuclear Management Company. Their patience, enthusiasm and quick response to requests for yet one more piece of information have been greatly appreciated.

Figure 2

Timeline of State Liberalization and Nuclear Plant Sales

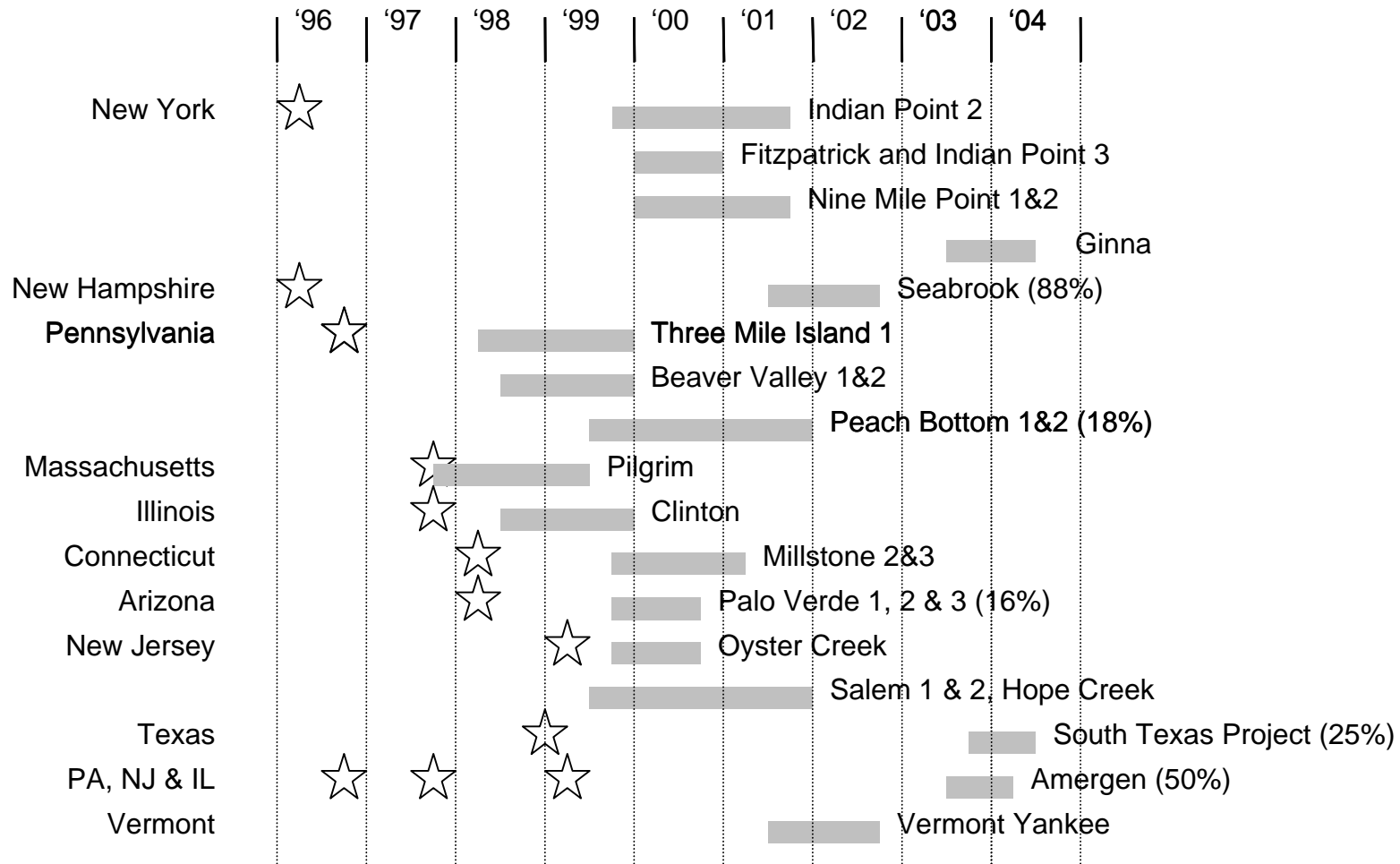


Figure 3a

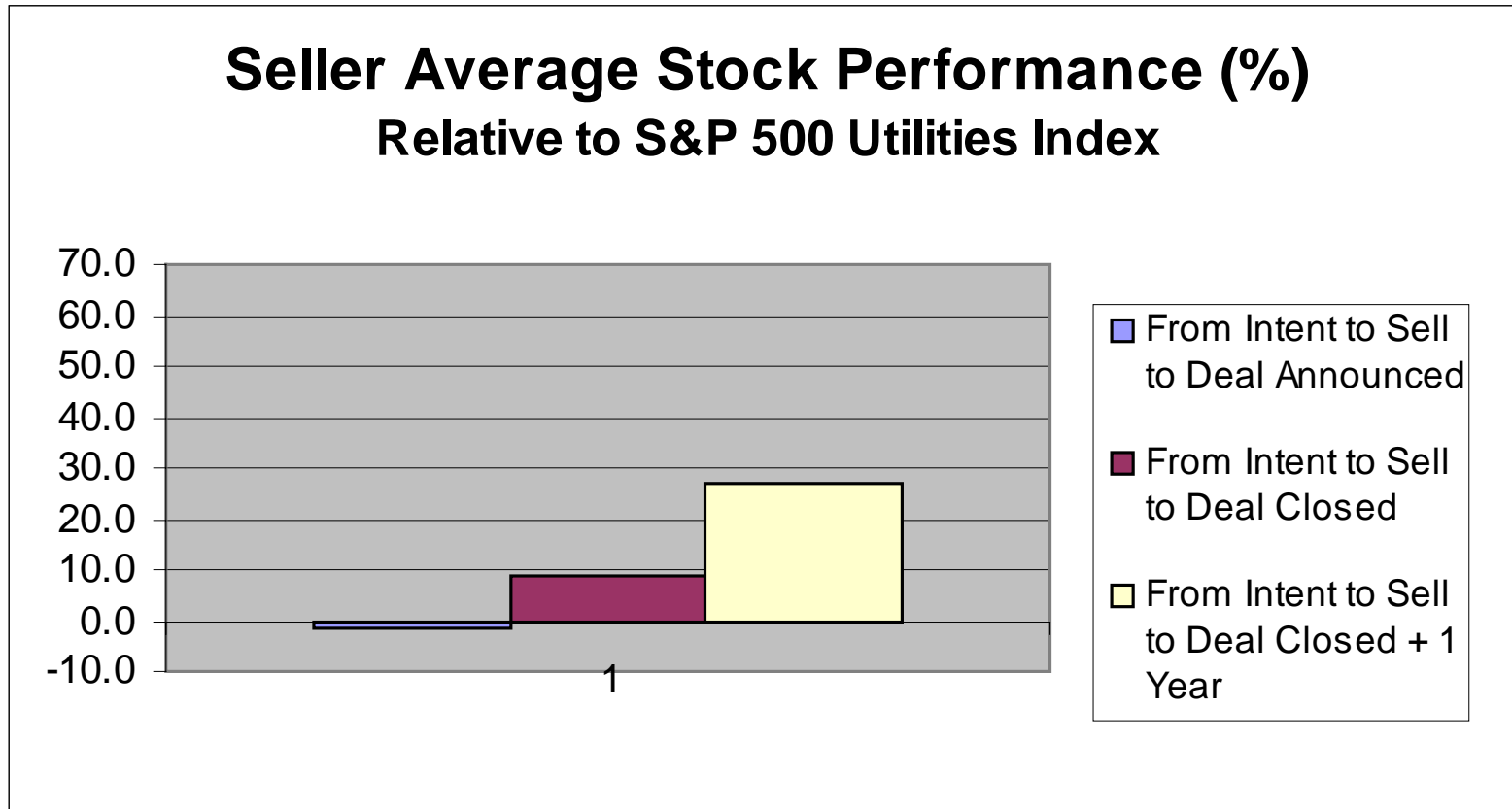


Figure 3b

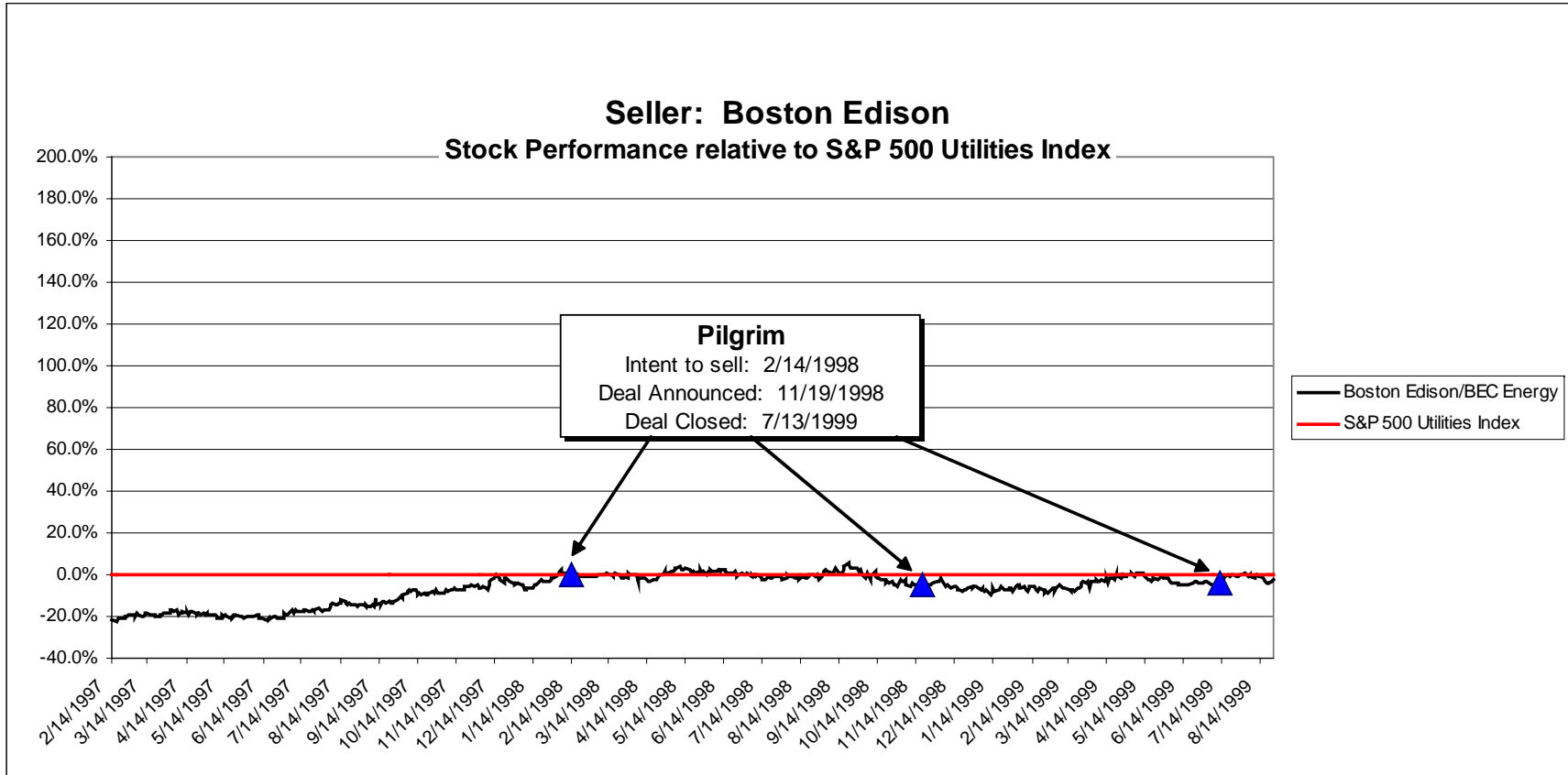


Figure 3c

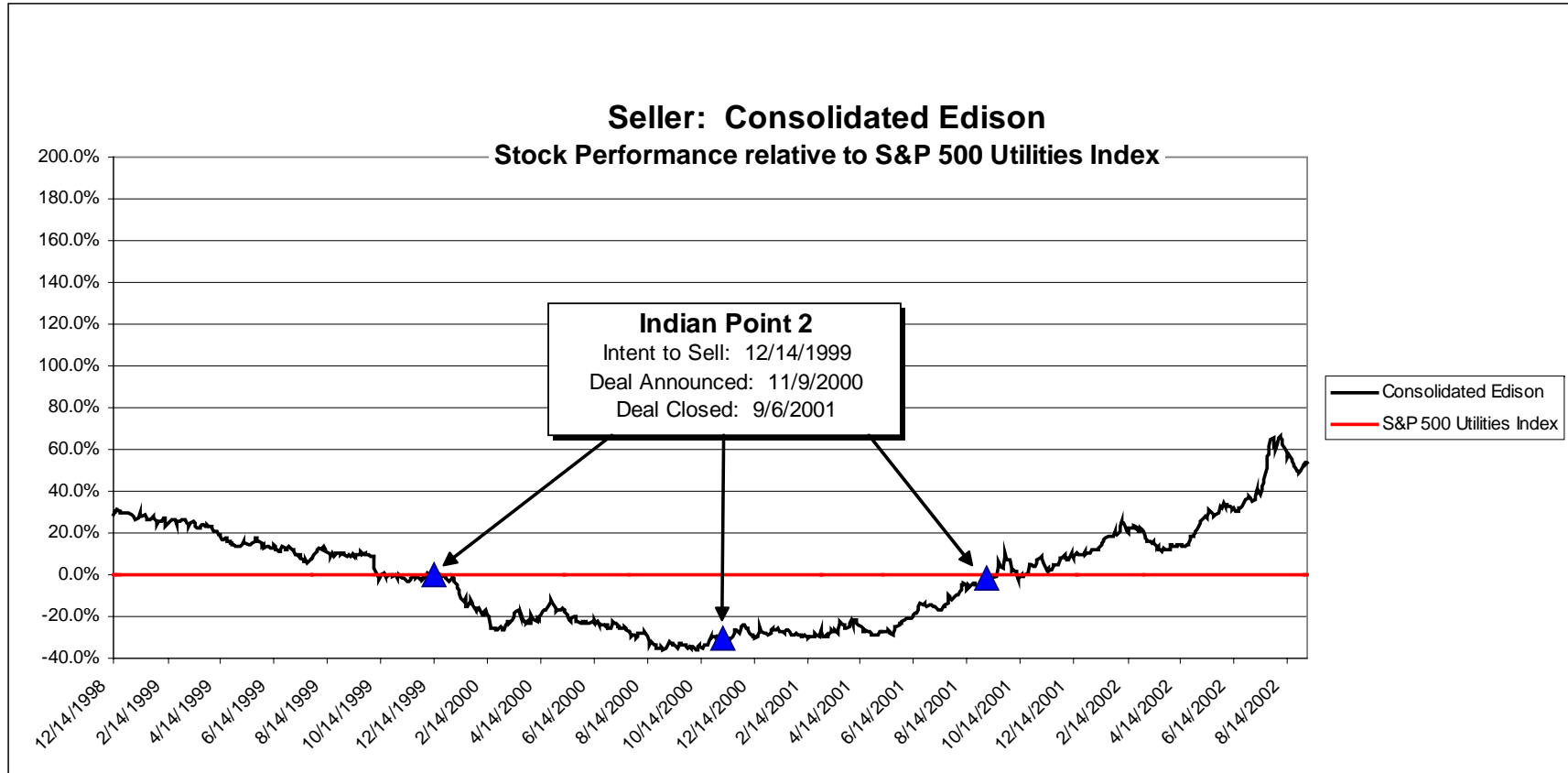


Figure 3d

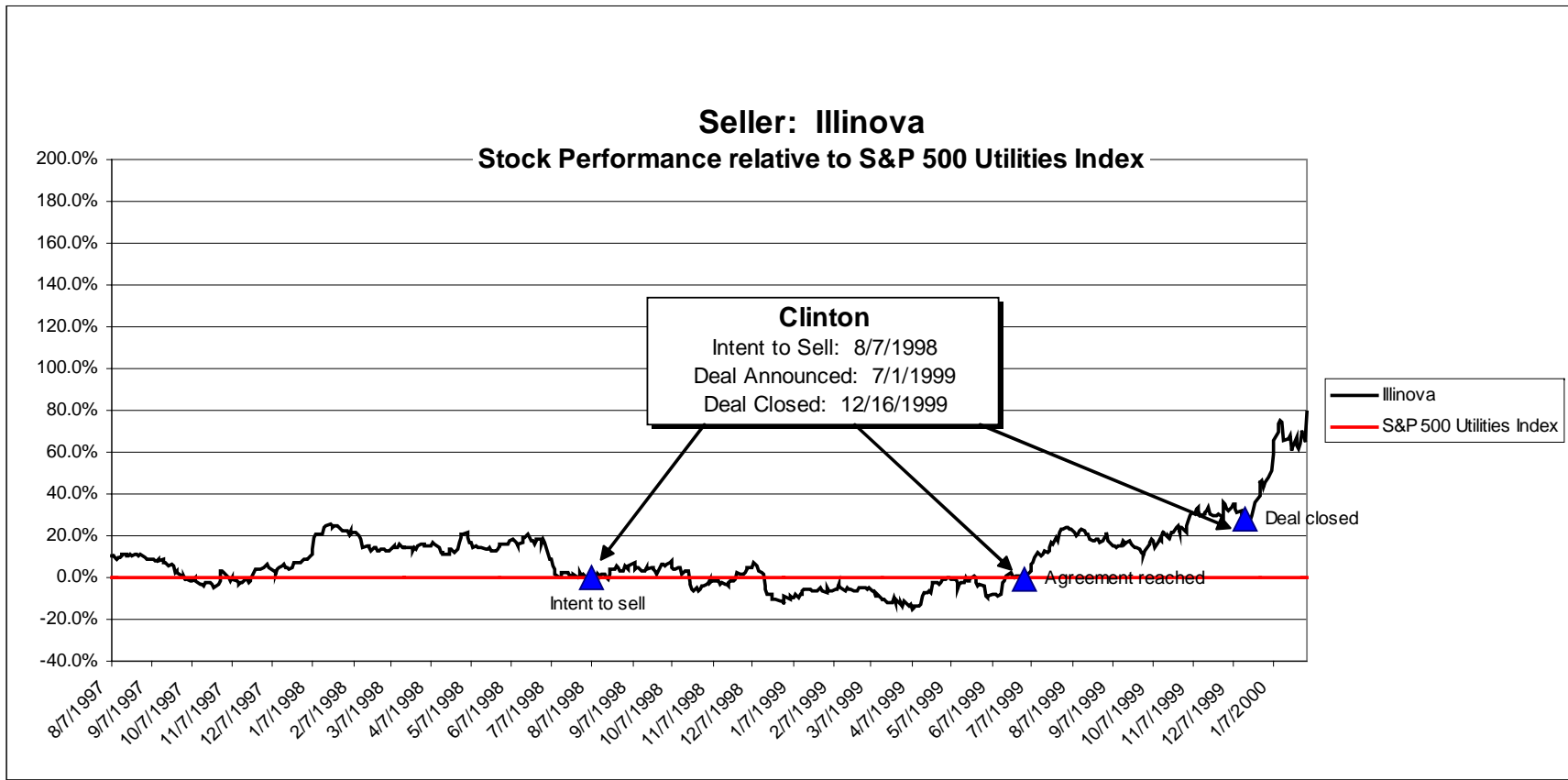


Figure 3e

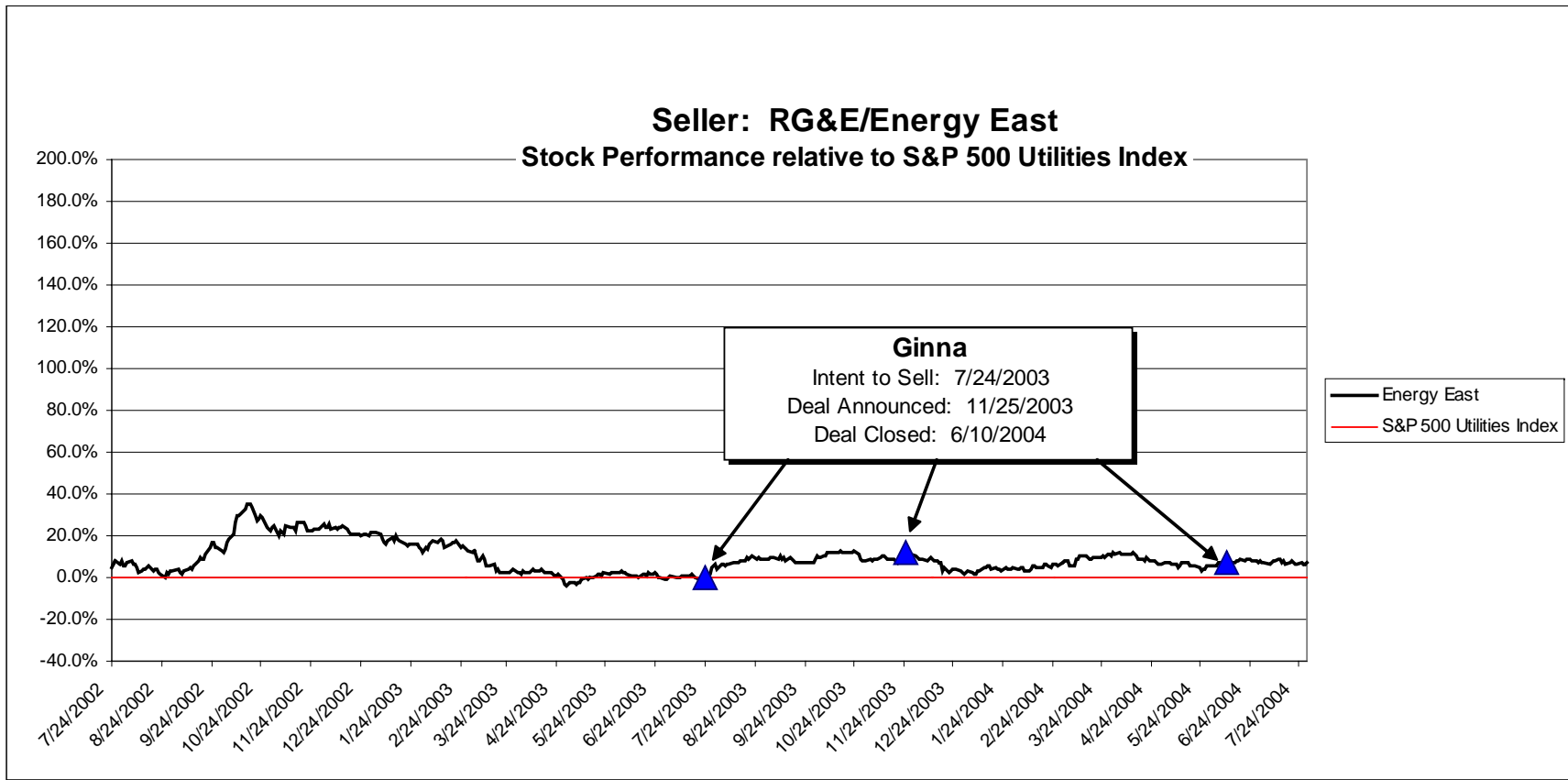


Figure 3f

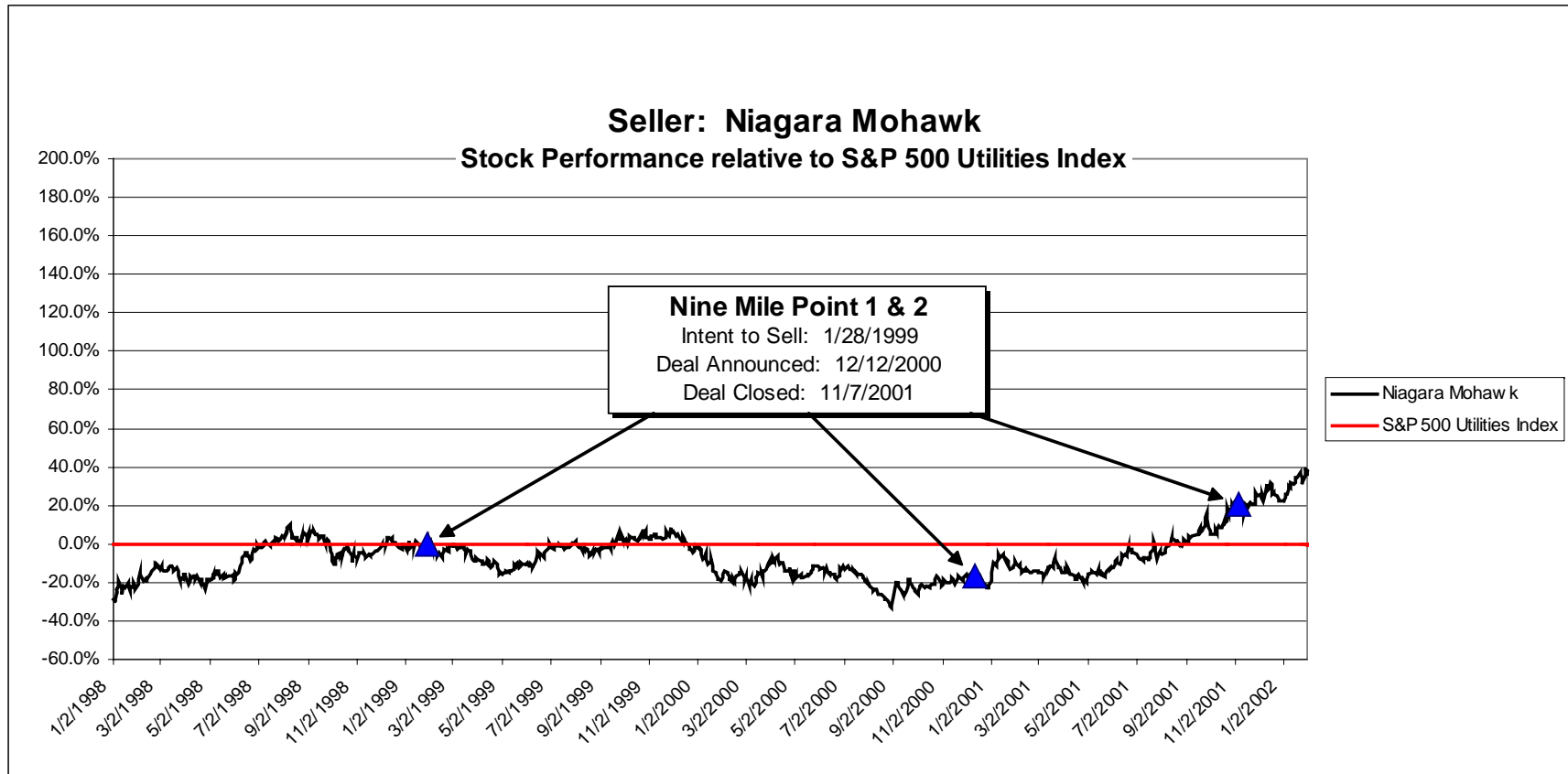


Figure 3g

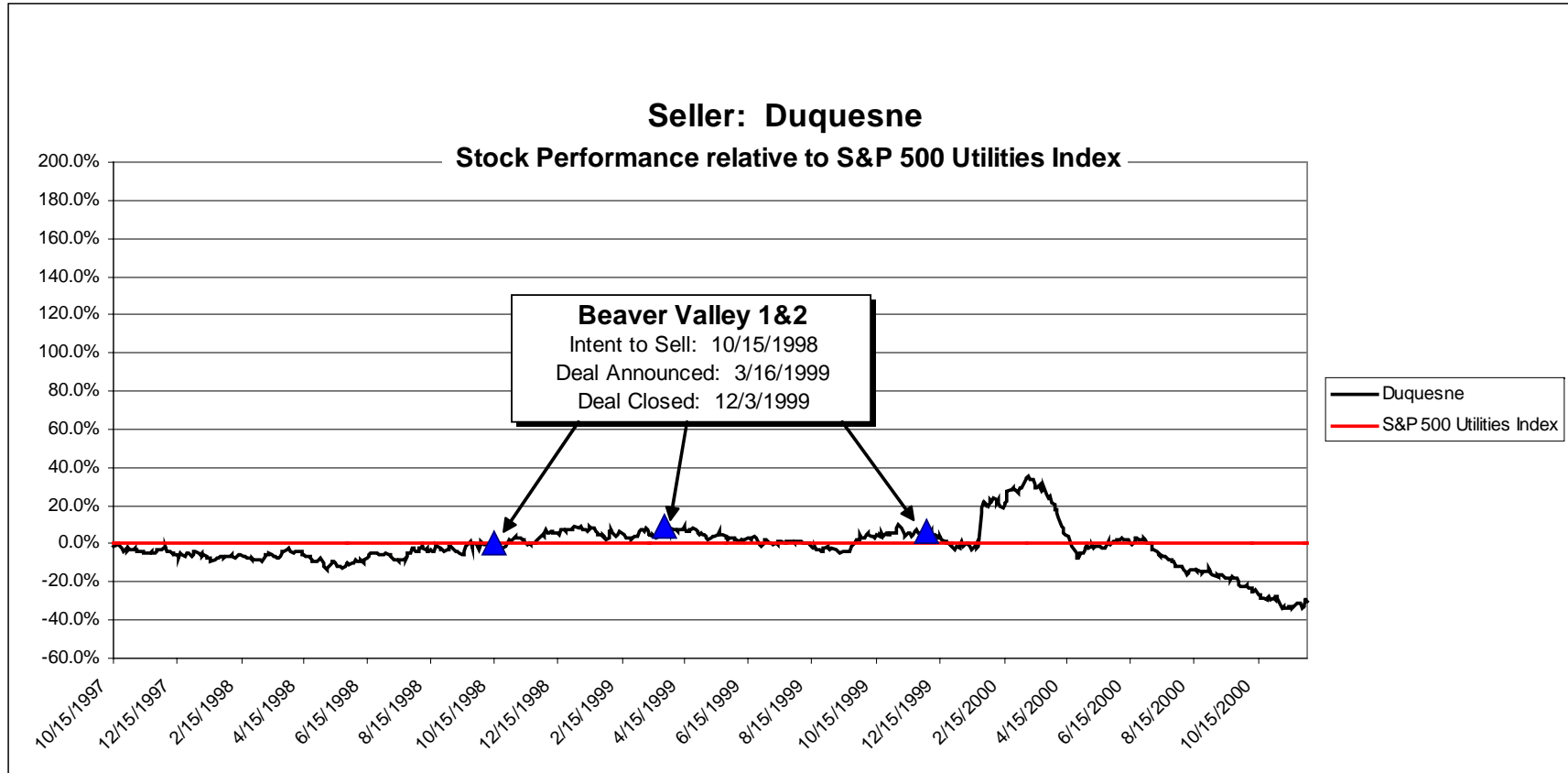


Figure 3h

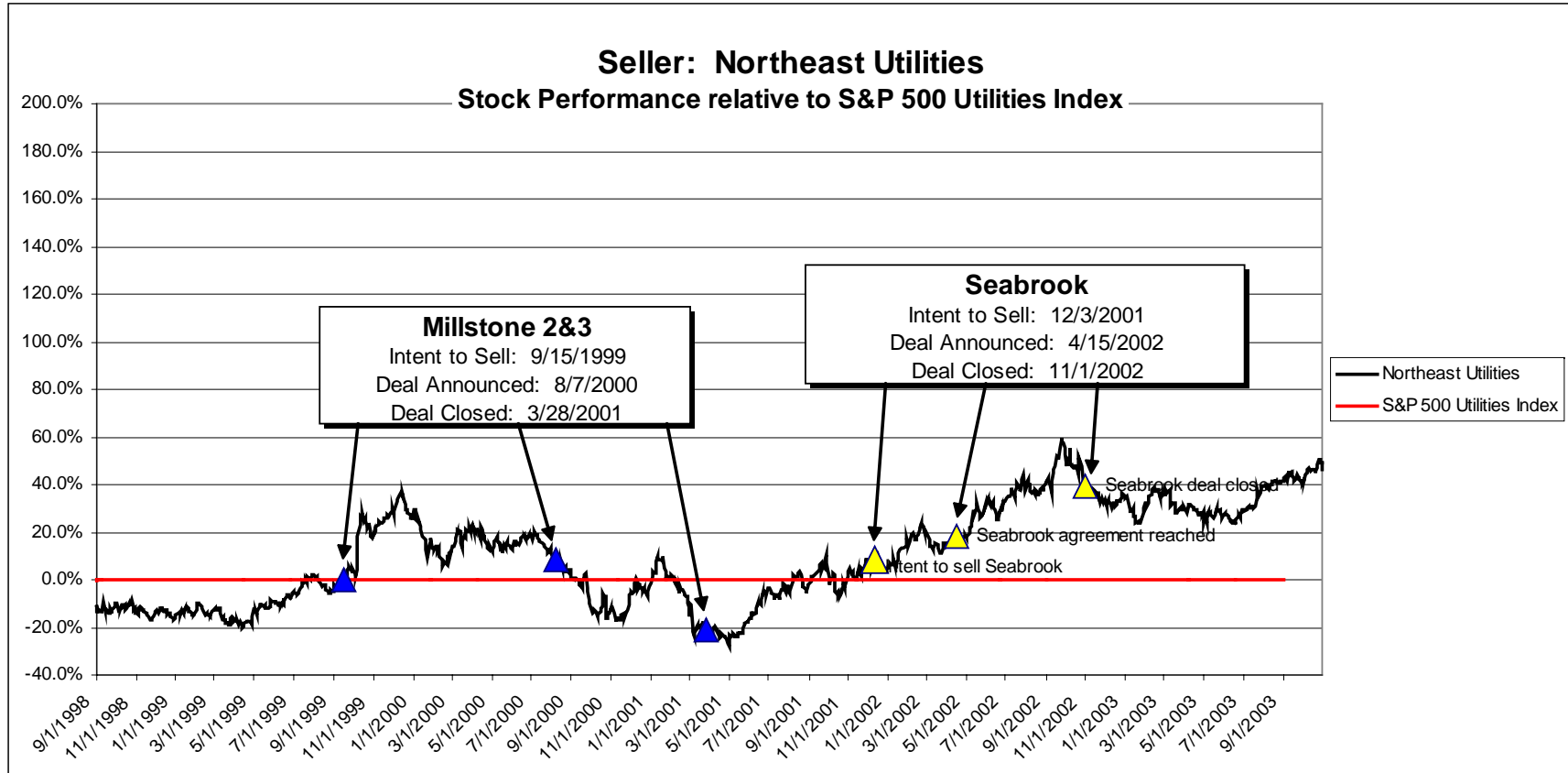


Figure 4a

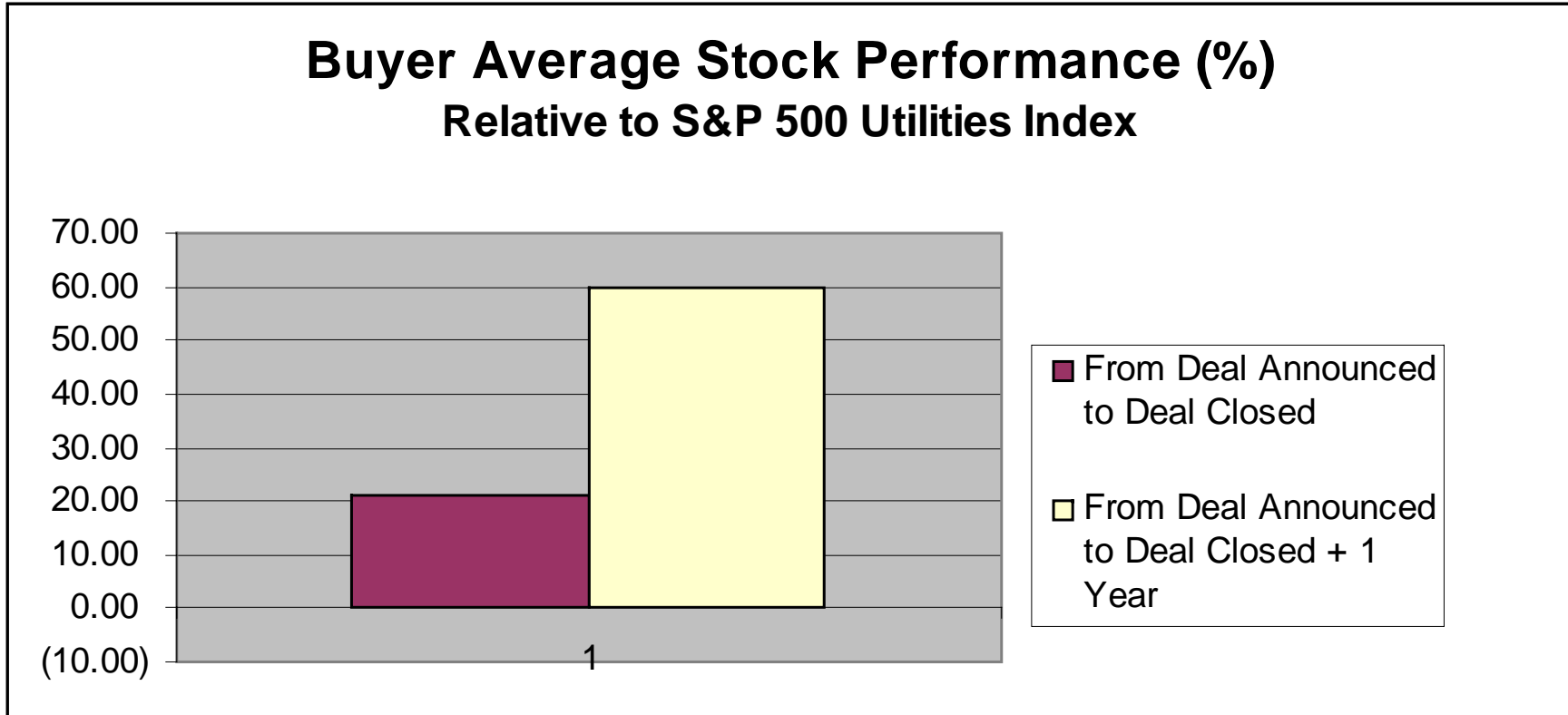


Figure 4b

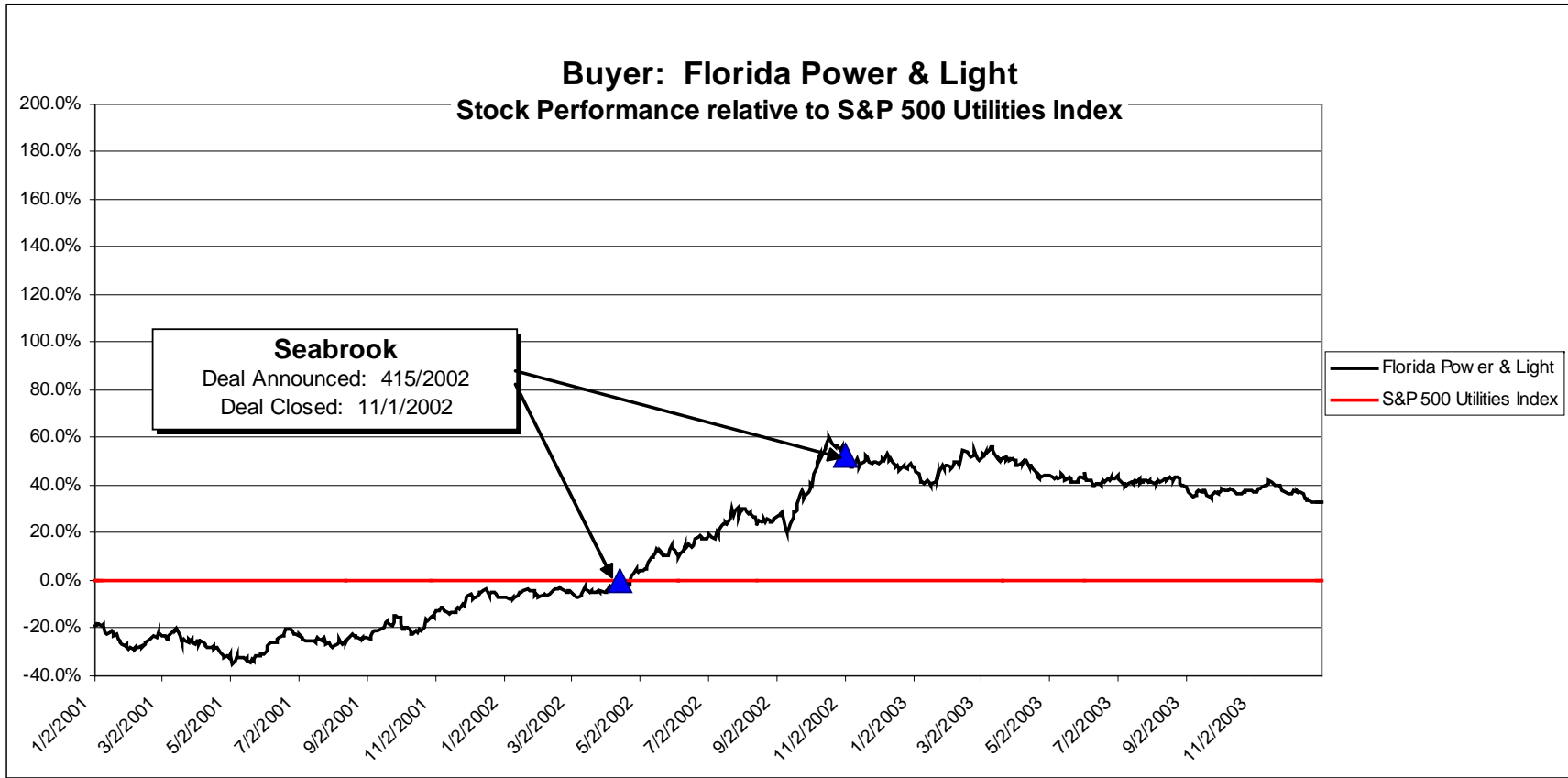


Figure 4c

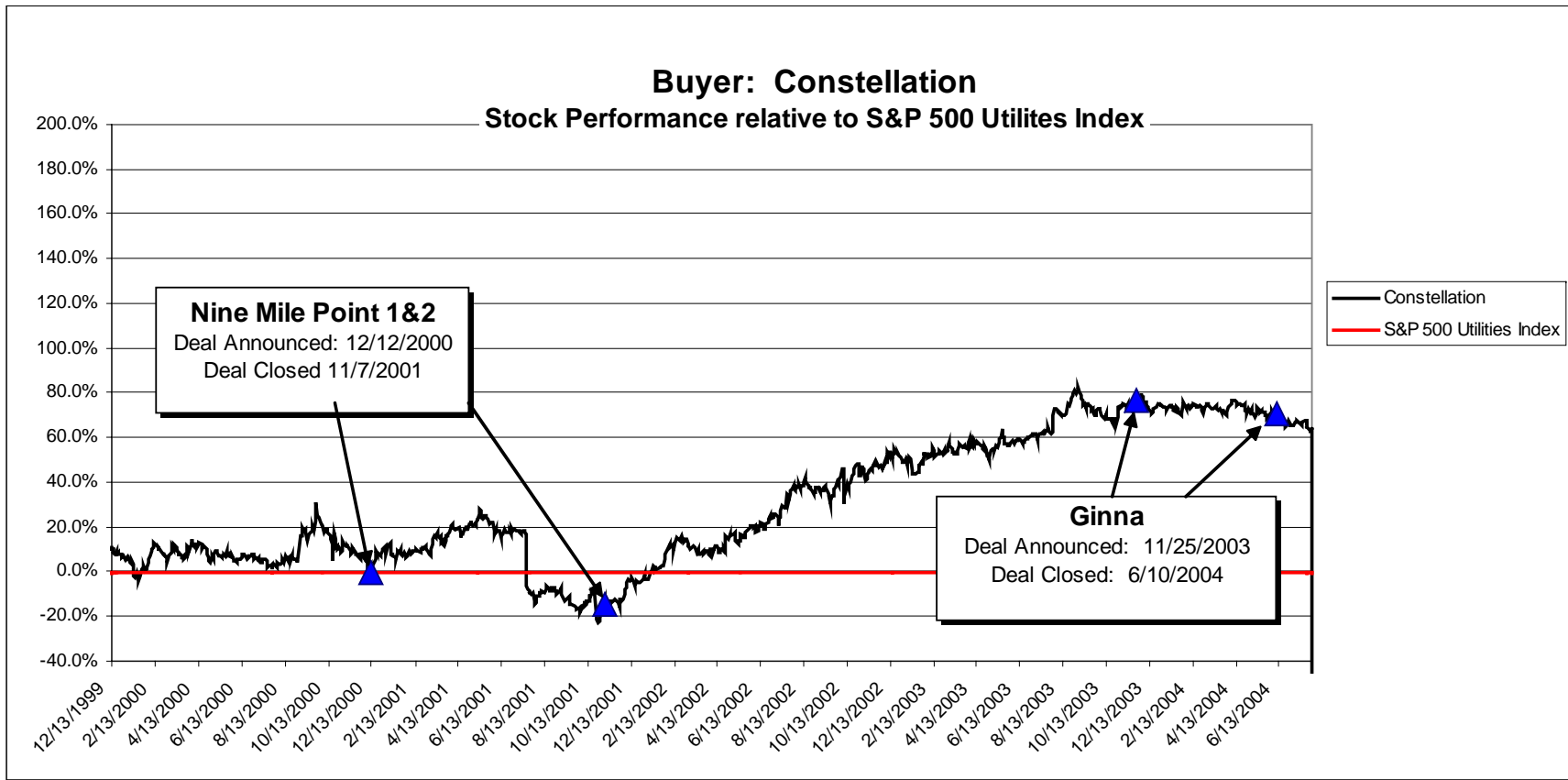


Figure 4d

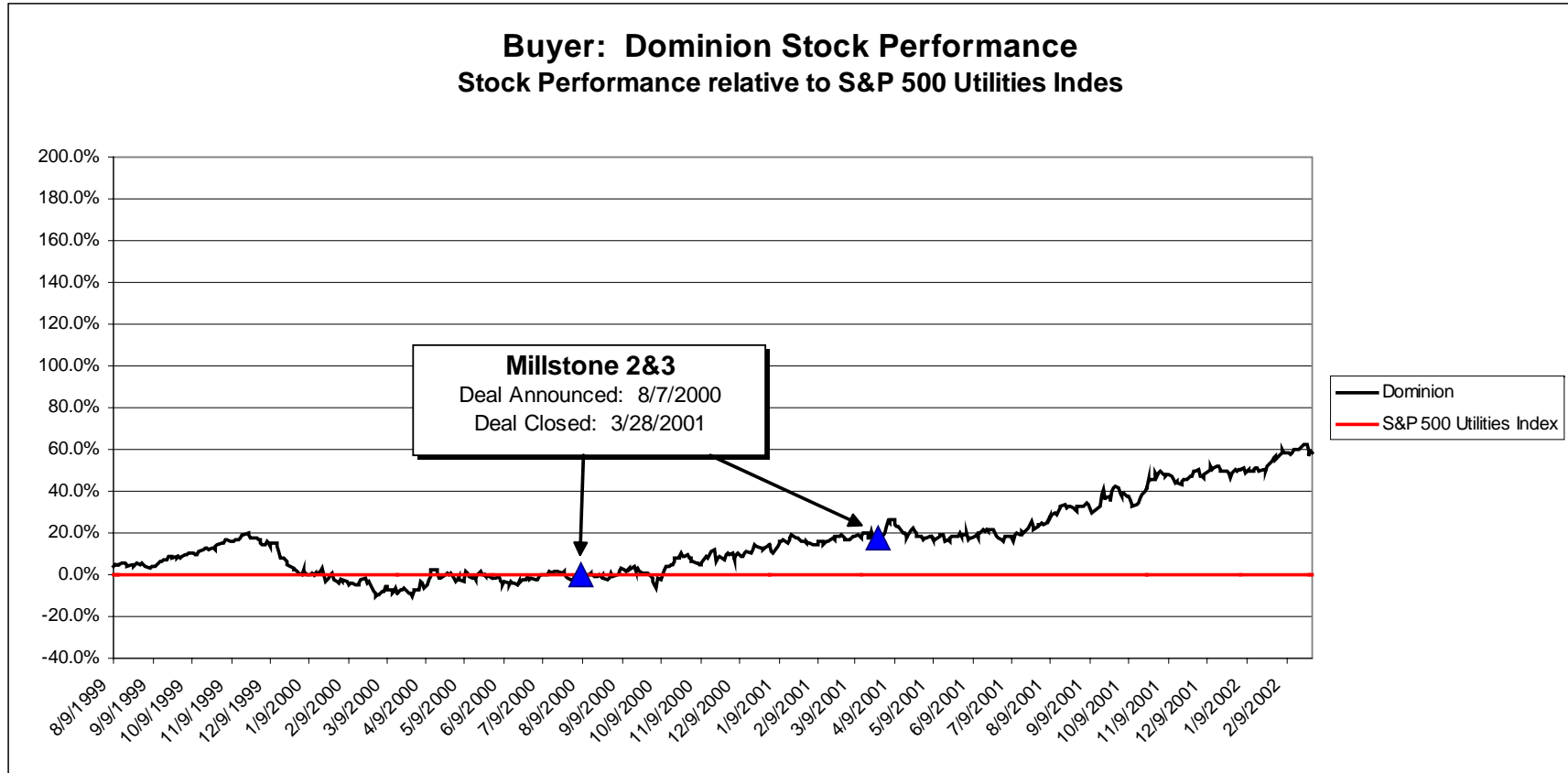


Figure 4e

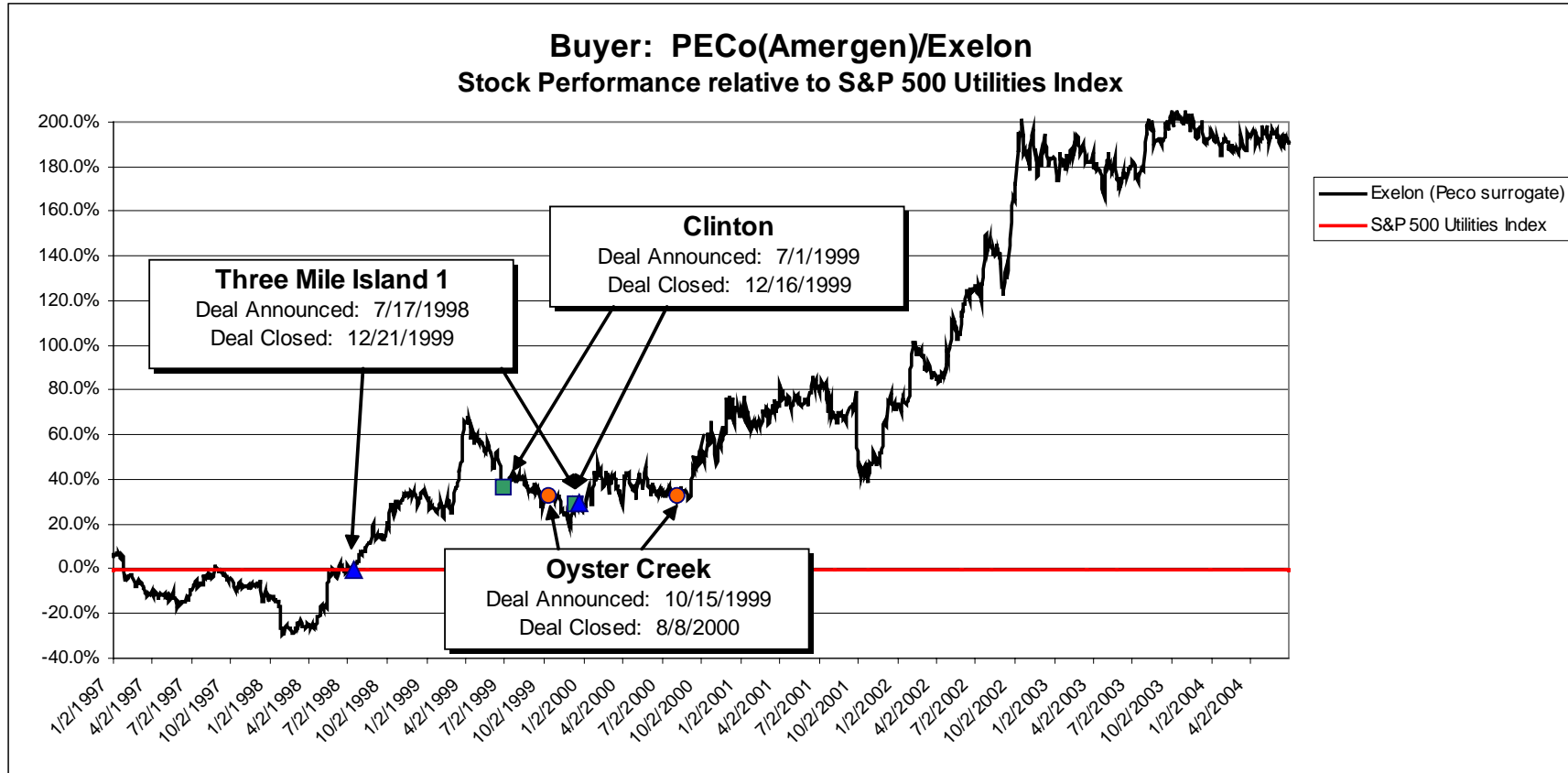


Figure 4f

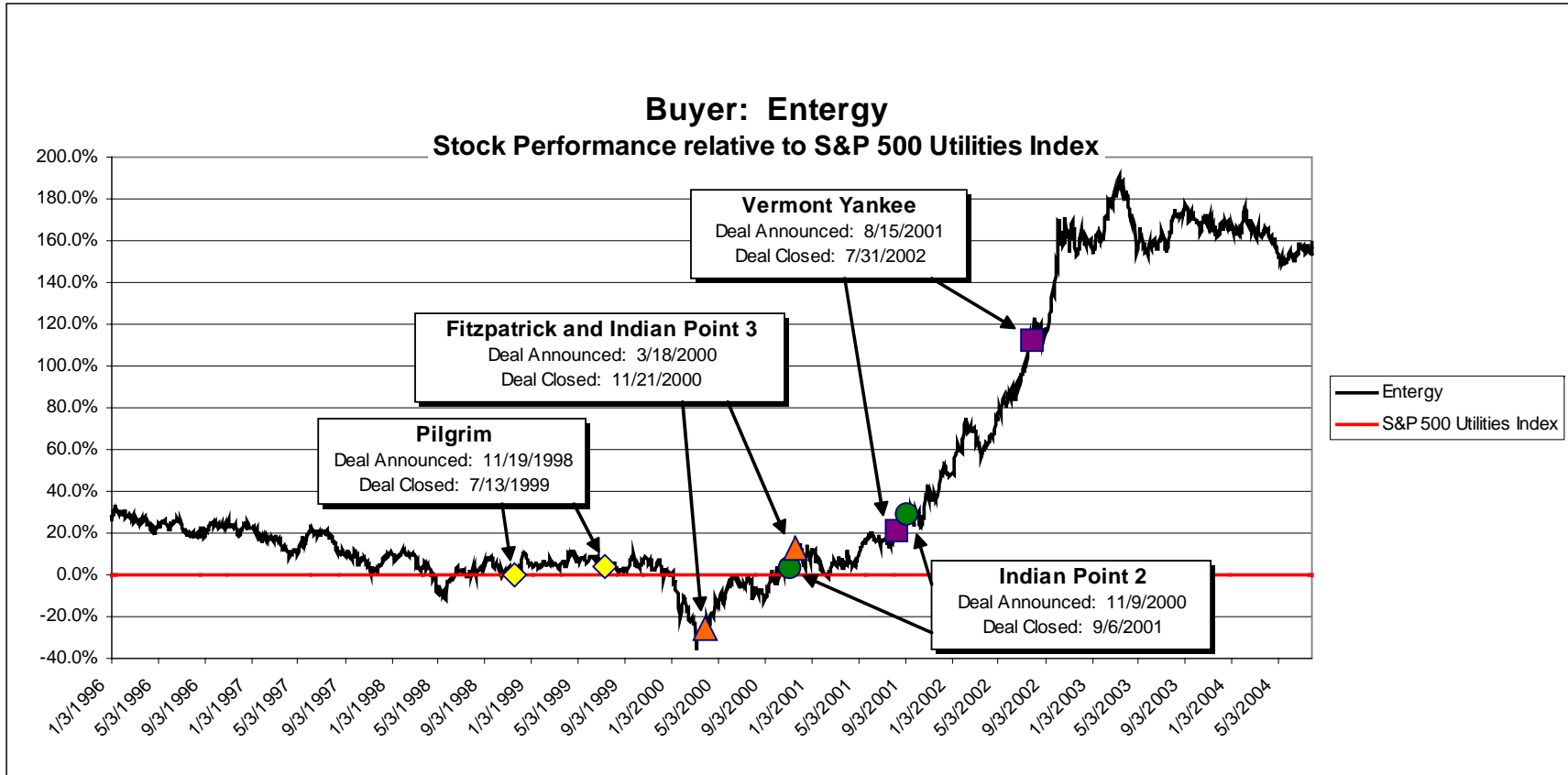


Figure 5a

Annual Unit Capability Factor
100% = Industry Average

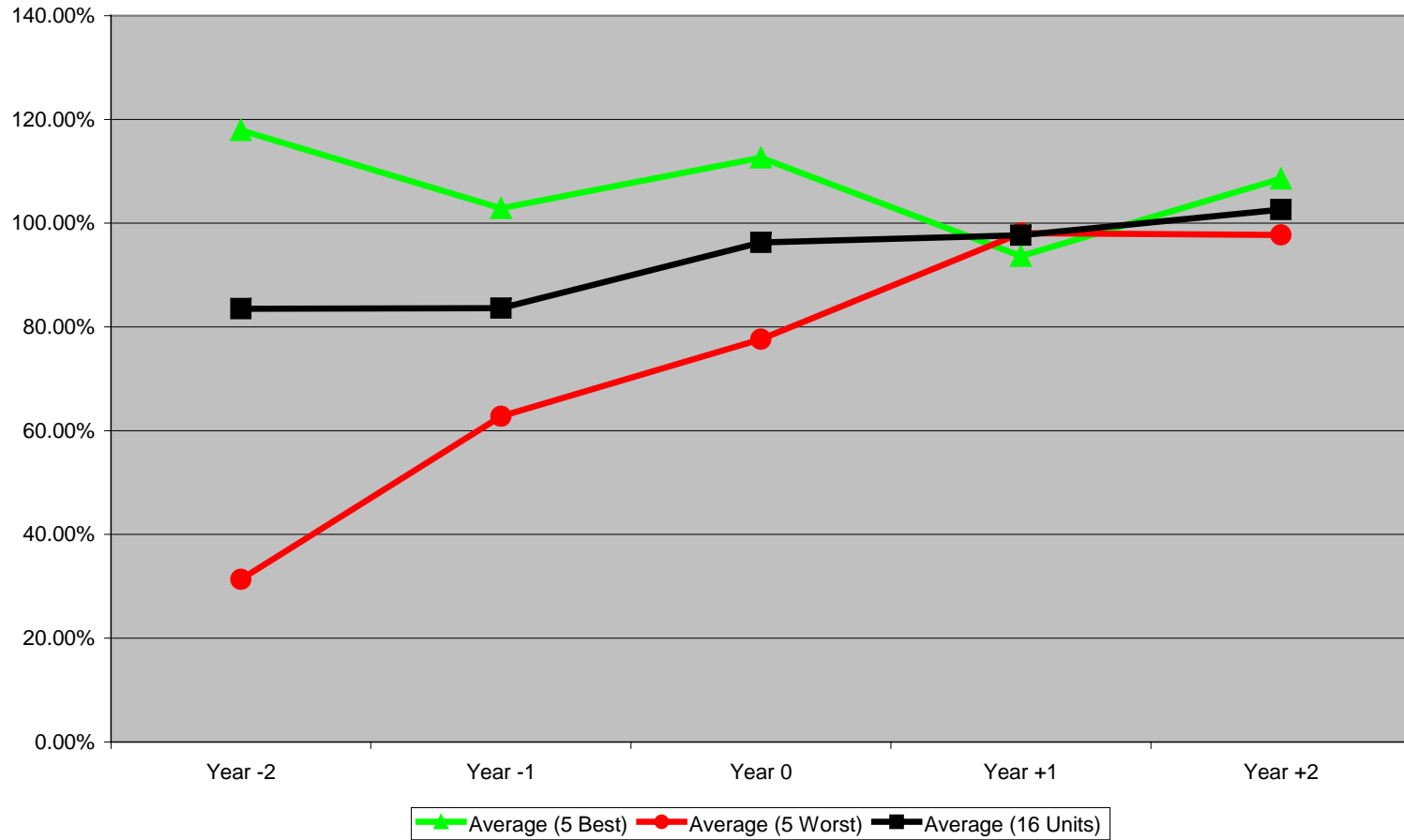


Figure 5b

Annual Unplanned Capability Loss Factor
100% = Industry Average

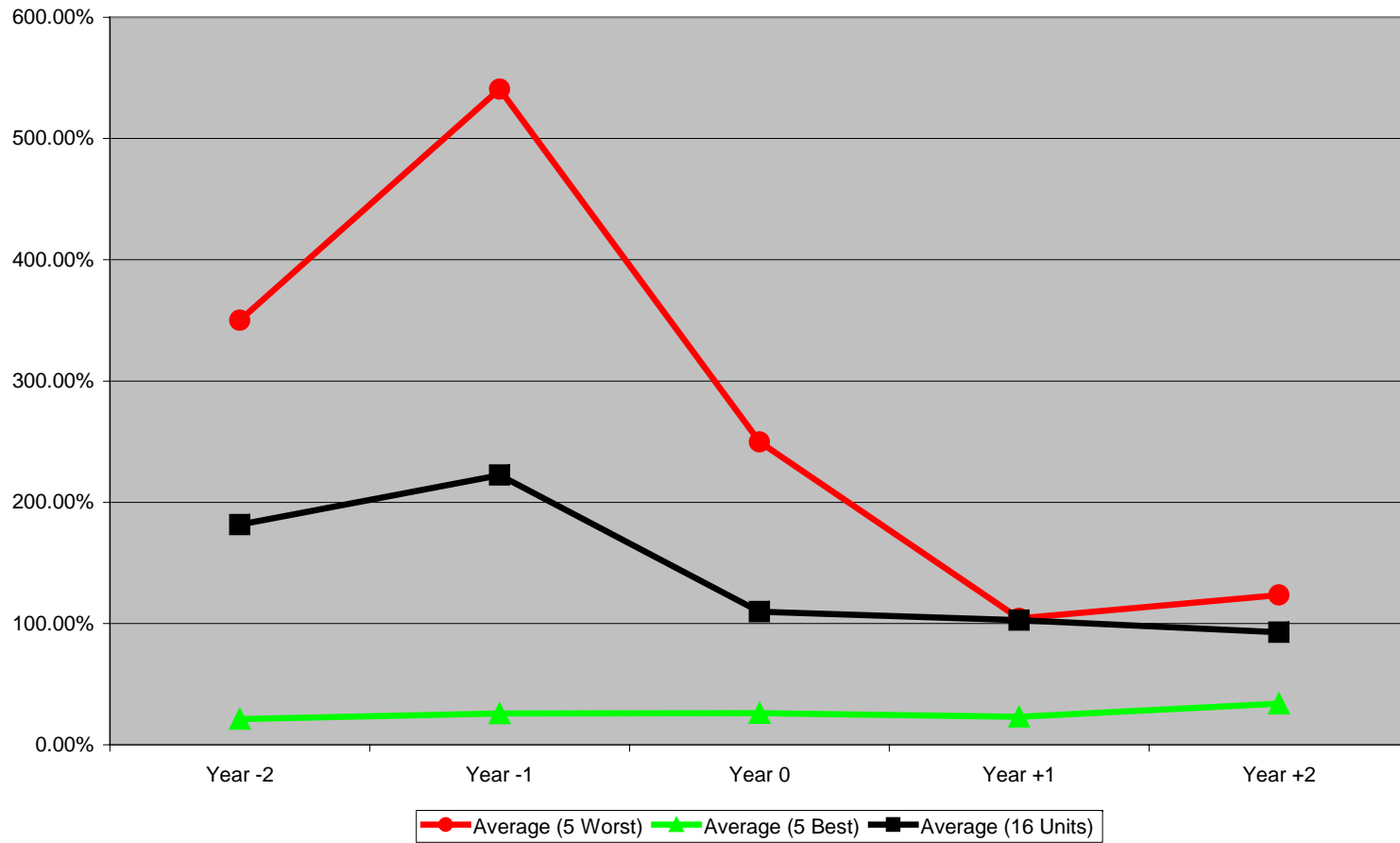


Figure 5c

Annual Forced Loss Rate
100% = Industry Average

