

# **Do Trading and Power Operations Mix?**

## **The Case of Constellation Energy Group 2008**

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*For the first seven years following its creation in 2000, Constellation Energy was a leader in the merchant power business, and its stock significantly outperformed the industry. Then, in the space of less than two months in 2008, the company found itself in a liquidity crisis in which its stock lost more than 70% of its value, leading to a forced sale at the low price. What happened? This paper argues that Constellation's crisis illustrates the hidden dangers that arise when a power company's trading operation stops playing a subordinate function and becomes the strategic focus of the business. The case highlights the illiquidity of many commodity trading portfolios. This increases the danger of potentially large contingent capital requirements. These are often overlooked in traditional VaR calculations. It is therefore easy to minimize the exposure and capital implicitly dedicated to the trading operation, exaggerating its profitability. When the trading unit shares a balance sheet with other operations, such as generation and customer supply, the capital required for trading is often borrowed from these other units without being paid for. Trading can improve the profitability of generation and customer supply if it is organized as a support function. If it is to be a profit center of its own, it should be organized on its own balance sheet away from the other operations.*

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## **INTRODUCTION**

For the first seven years following its creation in 2000, Constellation Energy (Constellation) was a leader in the merchant power business, and its stock significantly outperformed the industry. Then, in the space of less than two months in 2008, the company found itself in a liquidity crisis in which its stock lost more than 70% of its value—see Figure 1—leading to a forced sale at the low price. What happened?

The easy answer focuses on an unfortunate confluence of events. The commodity price spike in 2007-2008 sharply increased the risk of Constellation's trading positions. Simultaneously, Constellation had a major breakdown in its risk management information systems so that it was unaware of the large increases in contingent collateral required by its expanding trading operation. By the time the company realized its predicament and turned to the market to borrow money, the global financial market was entering an epochal liquidity crisis. Money couldn't be had at any reasonable price.

Those are the proximate causes. But an explanation that stops there is too fatalistic. Constellation had set itself up for these events. During the years of Constellation's original success, trading had played a subordinate, support function to the company's business of generating and wholesaling power. This changed in 2007 when the company made its commodity trading operation a separate profit center and gave this operation the central role in its growth strategy. The crisis of 2008 grew out of this newly expanded trading operation. Failure in this operation now undermined not just the trading operation itself, but the value of the generation and wholesale power operations as well.

We have been through this before. A different crisis in 2001-2002 forced the collapse of profit center trading operations at several U.S. power companies because it exposed the mistaken belief that these operations were driving profitability.

What are the lessons that need to be drawn from Constellation's crisis, as well as from the earlier experience in the power industry? Power generation and customer supply can benefit from a sophisticated trading operation so long as trading is organized as a support function. Separating trading into a separate profit center poses a danger to the overall business. The root of the problem is the difficulty in measuring risk and profitability in commodity trading operations. This problem has multiple elements.

First, management often imports the tools commonly employed in the financial industry without sufficient regard for the particularities of the company's commodity operations. Commodity trading portfolios often include very, very illiquid positions in physical assets. This illiquidity undermines the relevance of tools such as Value-at-Risk (VaR) which assume a position can be sold quickly. Reliance on VaR leads to significantly underestimating the complicated contingent capital requirements that arise with illiquid physical positions. Management generally underestimates the equity capital required to back-up its commodity trading.

Second, the discipline that might normally be imposed by the external capital markets is avoided when a commodity trading operation shares a balance sheet with other lines of business that have hard assets, such as power plants. The external capital market implicitly treats the hard assets as collateral on the trading positions, so that the trading unit is not explicitly charged for the capital required to back up its portfolio.

Third, it is very difficult to reliably determine how much of the profit earned is attributable to the trading operation and how much is attributable to the management of the hard assets and other non-trading activities. A trading operation can increase the profitability of the generation and customer supply units by serving as a source of intelligence about the market value of the power being produced and sold. When the trading operation is organized as a support function for generation and supply, it provides this intelligence impartially. However, once the trading operation is set-up as a profit center, the intelligence it provides must also be used to determine which unit produced the profit, trading or the other units of the company. This creates an inherent conflict of interest that is difficult to manage. When, as in the case of Constellation, the trading operation is made into the lead unit in the company's strategy, resistance is futile.

Generation and customer supply can benefit from a sophisticated trading operation. To do so, trading must be organized as a support function to these units and not as a profit center. Alternatively, commodity trading can be a separate, profitable line of business; but then it must be organized separate from other business units, so that it is forced to rely on its own balance sheet and its profitability is reliably measured.

This paper presents the case study of Constellation as a tool for making vivid these lessons. The next two sections describe the history of Constellation from 2000 through 2006, when the trading operation was organized to support generation and trading. Section 3 describes the strategic shift in 2007 that made trading a profit center. Section 4 details the crisis and how it was resolved. We then conclude with a return to the lessons this case illustrates. We draw there upon an earlier set of cases in the U.S. electric power industry which we maintain embody the same lesson. To tell the Constellation

case study, we rely exclusively on publicly available documents from the company itself as footnoted throughout the paper. Hence, we are taking the company's own representations at face value, but reading them using a different theoretical lens—and the advantage of hindsight. The objective here is not to establish a firm proof for our thesis. No single case could provide such a proof. But a specific case provides a dramatically interesting assemblage of facts that place powerful demands on any attempt to explain events in a manner consistent with all of our profession's theoretical and modeling tools. It is up to the reader then to take this explanation and to evaluate its theoretical adequacy as well as its usefulness in making sense of the suite of cases with which he or she is intimately familiar.

## **2. TRADING AS SUPPORT FUNCTION: CONSTELLATION 2000-2006**

Constellation Energy grew out of the Baltimore Gas & Electric (BGE) company, a traditionally regulated electric and gas utility serving customers in the area of Baltimore, Maryland. In 1999, Maryland passed restructuring legislation enabling competition among electricity suppliers. In response, BGE reorganized itself. Constellation Energy Group became the holding company and BGE became a subsidiary consisting of the legacy regulated electricity and gas distribution company operating in a defined territory. Next to the regulated BGE, Constellation operated what it called its “merchant,” with two dominant lines of business: power generation and customer supply. The company moved aggressively and successively to grow its merchant business in a competitive electricity market within and beyond its original territory.<sup>1</sup>

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<sup>1</sup> The material in this section is based on the discussions in Constellations various 10Ks through year end 2006, including the Baltimore Gas and Electric Co., Form 10-K for the Period Ending 12/31/98.

Constellation's trading operation provided support to this merchant business.<sup>2</sup> Trading managed the purchase of fuels and the sale of power for the generating units, sourced power to service the electricity load supply contracts, and performed overall portfolio management, including the hedging of Constellation's purchase and supply commitments. From 2000 through 2006, Constellation's annual 10K reported separate profit figures for (i) generation, (ii) customer supply, and (iii) BGE, the regulated distribution utility, but there was no separate profit figure for trading. Organizationally trading was positioned as an activity of the customer supply business, although it also provided support to generation. Figure 2 shows the financial reporting structure as produced in Constellation's 10K for fiscal year 2006.

How does trading support the generation and customer supply businesses? Let's take as an example the needs of Constellation's major customer channel, local utilities which have an obligation to provide whatever quantity of electric power their customers demand, at all times and in all quantities. The local utility's total load varies by the hour of the day, the day of the week and the month of the year. It varies throughout the geography of its service territory. Constellation agreed to source this load. Doing so involves at least four distinct capabilities.

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<sup>2</sup> Over the years, Constellation used a changing set of labels for what I term the trading operations. These have included risk management and portfolio management, among others. In this paper, I use the term trading operations very broadly to encompass a number of complementary activities that generally accompany wholesale power marketing. These would include risk analytics, risk management consulting services, trade execution, structuring transactions, dynamic hedging and portfolio management, among others. My usage is not meant to be shaped by Constellation's varying usage over time. Rather, it is generic and so encompasses similar operations at other companies. In time, Constellation appears to have used the term "trading" exclusively to refer to what I call "proprietary trading," i.e., not to hedging transactions, but to transactions intended to capture a profit, whether in the form of an arbitrage or through the intentional exposure to risk. When I mean to speak of proprietary trading as opposed to other types of trading, I specifically say so.

The first is the ability to properly understand the utility's load requirement. This involves a significant investment in information technology. Large quantities of data must be processed to identify the expected level of load at each point in time and geographic location, to understand the statistical regularities of the demand from millions of customers as well as the patterns of volatility. And, of course, the information technology itself is nothing without the human and organizational capital required to organize, analyze and make sense of the data.

The second capability is a mastery of the administrative task of arranging delivery of the power, knowing the protocols and procedures of the markets where the customer is located and the markets in which Constellation sources the power, measuring and monitoring delivery and prices, and the ability to execute the relevant back office tasks to bill the local utility and pay for the sourced power.

The third capability is knowledge of the wholesale marketplace and the cost of sourcing power, who is selling power where and what to pay for it. A good trading operation provides more precise information about the cost of serving different loads and so enables the supplier to better price its services.

Fourth is the ability to offer the power on price terms that are useful to its customers. This involves providing some short-term insurance in the form of relatively fixed price terms for the power it will deliver. Sourcing fluctuating quantities of power from a volatile wholesale market and delivering it at fixed prices requires a sophisticated risk management operation. Constellation would evaluate the risk impounded into the contract terms it negotiates with the local utility and repackage these risks and offload them into the financial marketplace through a sophisticated hedging program.

Constellation's risk management operation would assess what price the financial market places on risk, and use that information to determine the pricing terms Constellation offered to potential customers. Included among the risks that the company would evaluate is the credit risk of the counterparties with which it did business, since that credit risk would mostly remain on Constellation's books. The supplier must have a strong enough balance sheet to hold the counterparty credit risk that it accepts.

Trading also supported the generation side of Constellation using these same capabilities. Electricity prices fluctuate dramatically, so that a kilowatt hour is not just a kilowatt hour: the value depends on where and when the electricity is delivered. Different generating units can produce different time profiles of power. Some units can be turned on and off more quickly than other units. Units can be designed, retrofitted and operated to maximize their flexibility. Maintenance and shutdowns can be scheduled when the power is least valuable. All of these management decisions need to be made based upon a constant stream of information and analysis about the value of power in the competitive wholesale market. The trading unit was a valuable source of intelligence about the marketplace and prices. While Constellation's generation unit retained responsibility for the day-to-day operation and maintenance of its power plants, the trading unit would cooperate with generation to set the company's plan for operation and dispatch of the individual units and assumed much of the responsibility for the logistics of delivering the power into the wholesale market. And the trading unit negotiated long-term contracts for sale of power from several of the plants. Finally, the trading unit maintained a contact list of other generators that it looked to on a shorter-term basis to obtain power. It also looked to the very short-run and anonymous wholesale marketplace for power. All of these



activities rely upon the same set of four functional capabilities described above in the supplier's relationship with local utilities.

In this business model, the trading operation was not a separate profit center. It was a cost center, fulfilling a support function to the customer supply and the generation businesses, just as the accounting, marketing and IT departments fulfill support functions. Trading helps to maximize the margin earned supplying load and generating power. The margins earned by each of these business captures the return on all of the capabilities that combine to make the business possible, including the capabilities provided by the trading operation. Trading does not have any separate capital allocation, and does not measure a separate profit.

### **3. TRADING AS A PROFIT CENTER: CONSTELLATION 2007-2008**

In January 2007, Constellation management premiered a new organizational structure for its merchant units.<sup>3</sup> This new structure promoted trading to a separate profit center sitting side-by-side with generation and customer supply. Initially, Constellation described this unit as "Risk Management & Investing." It eventually titled it "Global Commodities." Global Commodities consisted of (i) risk management services provided to Constellation's own generation and customer supply units, (ii) structured products, which were risk management services marketed outside the firm, (iii) a proprietary trading portfolio, and (iv) energy investments, which included direct investments in upstream natural gas production, bulk shipping and coal supply.<sup>4</sup> Figure 3 shows the

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<sup>3</sup> "Constellation Energy 2007 Analyst Presentation," January 31, 2007.

<sup>4</sup> "Constellation Energy 2008 Analyst Presentation," January 30, 2008 and Constellation Energy Group Inc., Forms 10-Q for the Period Ending 3/31/08 and the Period Ending 6/30/08.

financial reporting structure as produced in the 10Qs for the first and second quarter of 2008, augmented with information from contemporaneous analyst presentations.

How does trading earn a profit as a separate line of business?

Obviously, some of its activities are the same as a trading operation run as a support function to a generation unit or a customer supply unit. The trading operation would now charge an internal transfer price for the services it had always been providing. Selling the same services to outside customers is just an outward-facing extension of this previously internal-facing service. In both cases, much of the capital required for the business is the investment in information systems together with the human and organizational capital required to operate the business. In addition, in offering risk management services to outside customers, Constellation accepts exposure to credit risk and it will have to hold risk capital against this exposure.

In running a proprietary trading portfolio, Constellation is seeking to directly profit off of what it believes to be its own superior information about key market variables. To do this, it must purposefully put selected market risks onto its balance sheet. While the company will try to minimize exposures to risks about which it has no superior information and hence no expectation of superior profit, its basic objective is to expand its exposure to those risks on which it thinks that it does have superior information. This makes running a proprietary trading portfolio a fundamentally different business from other trading functions which are generally focused on hedging or reducing the market risks put onto the company's balance sheet.

Constellation's activities in energy investments—upstream natural gas production, bulk shipping and coal supply—were considered by Constellation to be an

extension of its proprietary trading portfolio. For example, its investments in upstream gas were predicated on its superior valuation information derived from its risk management expertise. Constellation would then restructure the gas field's development strategy and operations, provide some financial hedging, and then flip the property.<sup>5</sup> This explains the curious fact that what look like fundamentally hard asset businesses, comparable in other regards to the separate electric generation unit, were consolidated under the trading operation. The value on these energy investments was supposed to derive from Constellation's trading skills, and not primarily from Constellation's own expertise in drilling for natural gas, operating ships or managing coal logistics.

Constellation introduced its newly independent trading unit in a January 2007 Analyst Presentation. It compared this profit center business against banks like Bear Stearns, Goldman Sachs and Lehman Brothers.<sup>6</sup> Based on the historical returns at these comparables, Constellation established a required rate of return on equity for this business unit of 14-20%. It estimated the risk capital required to support the new unit at between \$900 million and \$1.1 billion, and forecasted 2007 EBITDA for this business of \$342 million. This implied an extraordinary 31% rate of return on equity, with which Constellation's management was obviously proud to advertise.<sup>7</sup> This was an outrageous forecast and should have been a warning of the problems to come. It seems like prima facie evidence that Constellation was repeating the common mistakes that lead to grossly

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<sup>5</sup> See, for example, "Constellation Energy 2007 Analyst Presentation," January 31, 2007, p. 32.

<sup>6</sup> "Constellation Energy 2007 Analyst Presentation," January 31, 2007, pp. 63 and 91.

<sup>7</sup> "Constellation Energy 2007 Analyst Presentation," January 31, 2007, pp. 19, 31-32 and 64.

exaggerated estimates for the profitability in the trading unit, setting itself up for the disaster to come.

Constellation reported that the VaR on the small proprietary trading portfolio it had maintained in 2004, measured as the 99% confidence bound on a 1-day holding period loss, was only \$2.6 million. Now, with the reorganization the size of Constellation's exposure grew significantly. By year-end 2007 the VaR had grown to \$11 million, which is an annual average growth rate of 62%. In 2004, the gross margin on proprietary trading and related activities was only \$93 million. By 2007 this had grown to \$435 million, which is an annual average growth rate of 67%.<sup>8</sup> Constellation also significantly expanded the new trading units natural gas and coal operations.

#### **4. THE CRISIS**

Commodity prices began to rise sharply beginning in 2007. The rise escalated dramatically in the first half of 2008. From the start of 2007 to mid-2008, the natural gas price more than doubled, while the coal price doubled just in the first half of 2008. These price increases translated into a higher exposure on any given physical position. Table 1 shows Constellation's calculation of the VaR per physical unit traded for various commodities and for various dates from year-end 2006 into 2008. The rise in the VaR is remarkable. This increasing exposure to market risk translated into increasing collateral requirements, given that the company was to maintain the same physical position in each commodity.

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<sup>8</sup> "Constellation Energy 2007 Analyst Presentation," January 31, 2007, p. 95 and "Constellation Energy 2008 Analyst Presentation," January 30, 2008.

Factors specific to Constellation's recently expanded coal business added to the liquidity pressure. Many of Constellation's contracts that went out-of-the-money had clauses requiring margin payments, while many of its contracts that went in-the-money did not. Therefore, Constellation experienced a net cash draw, even when the net mark-to-market position was little changed. This sort of asymmetry might seem unusual to traders in certain purely financial markets, but they are not uncommon for certain types of commodity trading operations. This is part of what makes certain commodity trading operations so distinctive. It also happened that many of the counterparties Constellation did business with in the coal industry were below investment grade, so that as the positions went in-the-money, Constellation had to recognize increasing credit exposure to low rated counterparties. During the first quarter of 2008, Constellation experienced a major default by one of its coal counterparties, and this seriously impacted its earnings that quarter. This was the first direct wholesale credit loss Constellation had reported in its history.<sup>9</sup>

These events precipitated an enormous liquidity drain on Constellation. A key variable in Constellation's exploding crisis was the contingent collateral required in the event of a credit rating downgrade below investment grade. At year-end 2006 this figure stood at \$1.288 billion. At year-end 2007 it was \$1.336. During the first quarter of 2008 this amount more than doubled, to \$3.234 billion. During the second quarter of 2008 it increased by another \$1.336 billion to a total of \$4.570 billion.<sup>10</sup>

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<sup>9</sup> Constellation Form 10-Q for the Period Ending 3/31/08, p. 26, and "Constellation Energy 2008 Analyst Meeting, August 27, 2008," p. 27.

<sup>10</sup> "Constellation Energy 2008 Analyst Meeting, August 27, 2008," p. 27 and Constellation Form 10-Q for the Period Ending 3/31/08, p. 26.

These figures swamped Constellation's available sources of liquidity. Release of the figures in August 2008 sparked the market speculation that Constellation would not be able to meet such a call, driving down its stock price. This prompted the credit rating agencies to consider downgrading Constellation, which, of course, would trigger the feared capital call. Constellation's only available option was to hurriedly raise the new capital or pare down the operations requiring the collateral, or both. Constellation attempted to sell key components of the trading operation. It announced plans to sell upstream natural gas assets and suggested it was looking to offload a sizeable fraction of its coal business as well. It was ultimately forced to sell off its proprietary trading business and return the trading operation to once again serve a support function role for Constellation's generation and customer supply businesses.<sup>11</sup>

The problem facing Constellation, however, was that few of these transactions could be executed swiftly enough to match the speed with which it was potentially obligated to post collateral. In its presentations, Constellation had generally focused on the VaR calculated assuming a 1-day holding period. In its 10K it also reported a the VaR calculated assuming a 10-day holding period.<sup>12</sup> These turned out to be completely inadequate measures of the company's total exposure since they implicitly misrepresented the actual liquidity of the underlying portfolio. Consequently, the company as a whole was forced into a fire sale. In mid-September 2008 it negotiated an emergency cash injection of \$1 billion from Warren Buffet's Mid-American Energy

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<sup>11</sup> Constellation's Form 10-K, for the Period Ending 12/31/08.

<sup>12</sup> See, for example, Constellation's Form 10-K, for the Period Ending 12/31/07.

Holdings. The price extracted was the sale of the entire company for just \$4.7 billion or \$26.50/share. Less than two months before, the stock had been selling for \$82/share.

Although Mid-American did provide the cash that solved Constellation's liquidity crisis, the sale to Mid-American never finally closed. In the months that followed, EDF, the French utility which was already a major shareholder in Constellation and which had a stake in a nuclear joint venture with the company, decided to come forward with a competing offer in order to preserve its own strategic goals. EDF received a 50% stake in Constellation's nuclear generating units in exchange for \$4.7 billion. Constellation otherwise remained an independent company, with full ownership of its fossil generating units, its customer supply business and its regulated unit, BGE. To complete the substitute deal it was necessary to buy out Mid-American's stake at a significant premium.

In evaluating the cost of the liquidity crisis created by the trading operation, it is important to appreciate that it wasn't just the trading operation that had to be sold at a discount. It was the full company. The liquidity crisis in the trading operation forced the company as a whole to be sold at a value far below the fair value of just the company's generating assets alone. To see this, we can use as a benchmark for the fair value of Constellation's generating assets the subsequent transaction between EDF and Constellation in which EDF purchased a 50% stake in Constellation's nuclear generating units. The cost to EDF was approximately \$4.7 billion, implying that just the nuclear assets alone were worth more than \$9.4 billion. The other generating assets and the customer supply business should have raised the value still higher. This gives us a floor on the value of Constellation absent a separate profit center for trading. However, in

September 2008, Constellation trading's liquidity crisis forced the company as a whole to sell itself to Mid-American Energy Holdings for just \$4.7 billion, much less than the value of the non-trading businesses.

## **5. CONCLUSION**

The thesis we proposed at the outset for understanding the crisis that struck Constellation is that the risk in a commodity trading operation is easily underestimated and the profitability exaggerated. VaR models underestimate the contingent capital required for commodity trades because they ignore or minimize the illiquidity of the physical positions. When trading shares a balance sheet with other lines of businesses, such as generation, the full scale of capital required for trading is hidden since trading effectively borrows capital from the other businesses at no cost. And, especially when trading is promoted to the centerpiece of a company's strategy, the trading operation often claims large portion of the profits that should be attributed to the other lines of business.

We should have learned this lesson before. In the 1990s, a number of power companies developed trading operations that were eventually promoted to the strategic focus of the company. The most infamous of these was the Enron Corporation, but the list includes Dynegy, Williams, Aquila, El Paso and Mirant.<sup>13</sup> Coincident with the exposure of the fraud at Enron, the collapse of wholesale power prices led to collapsing margins in merchant generation. This in turn led to credit rating downgrades, eventually to below investment grade levels. This forced these companies to focus on the capital

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<sup>13</sup> The main body of the paragraph provides my summary of the common element across the set of five company histories. In the Appendix I provide additional detail and sourcing on the specific events for each company.



required for trading in a way that until then they had not. This is because an investment grade credit rating is required to run a trading operation, while it is not necessary to continue as a generator. Without an investment grade credit rating, counterparties are unwilling to trade with the company or they demand very high levels of collateral. The trading companies could have tried to post the necessary collateral. Alternatively, a number of companies considered alternative financial structures that would give their trading operation an above investment grade credit rating while the generation unit would operate with a lower credit rating. However, in most cases, the companies found that the capital required proved too costly. Prior to the ratings downgrade, the companies had run large proprietary portfolios that were not being fully charged for the risk capital the portfolios were implicitly consuming. So long as the proprietary trading could be conducted on the balance sheet funded by debt charged against the generation assets, the returns on proprietary trading appeared to be high. But as soon as the trading units had to capitalize their activities themselves, the returns did not appear so good. Once forced to shoulder the capital costs fully on their own account, these companies closed down their proprietary portfolios and the residual trading operation was reduced to a support function for the generation or other operations of the company.

In the case of Constellation, the surprising events of 2007-2008 quickly produced capital requirements that far exceeded what had been anticipated, and indeed were more than what Constellation could come up with. Because the trading operation was invested in illiquid physical positions, Constellation was unable to adjust its positions quickly enough to reduce the capital calls. Consequently, Constellation suffered a loss greater than the total value of the trading operation itself.

Commodity trading can be a profitable line of business. This is most likely to be the case when it is truly organized independently of other business units, so that it is forced to rely on its own balance sheet and its profitability is reliably measured.

Of course, many investment banks do run successful profit center commodity trading operations, and are able to exercise appropriate discipline in assessing the capital required. In addition to the investment banks, there are a few power companies that operate profit center trading operation. A good example was Sempra Energy, based in San Diego. Like many electricity companies, Sempra had its origins in the traditionally regulated San Diego Gas and Electric Company and the Southern California Gas Company, and it continues to operate those two units to this day. Sempra also has a deregulated electric power generation company, as well as gas pipeline, storage and LNG units. Finally, for a number of years Sempra owned a profitable commodities trading unit. It is important to understand, however, that this unit was entirely separate from Sempra's other units. Its main trading floor is in Connecticut, not in California. It trades in electricity, natural gas, petroleum, but also in metals. Sempra's commodities trading unit had its origins in Drexel, Burnham & Lambert and AIG Trading Corporation. While a part of Sempra, it was evaluated on the basis of its own profitability. Through 2007 the unit was reported on the financials as a separate segment. In April 2008, Sempra spun the commodities trading business off into a separate joint venture partnership with the Royal Bank of Scotland, called RBS Sempra Commodities. The assets of the partnership have since been sold as a result of a regulatory directive to RBS following the global financial crisis. Sempra's spin-off of the unit adds emphasis to the point that the trading operation

was fully strategically independent from the rest of Sempra's businesses. This independence encourages a discipline in assessing the capital required by the unit.

Constellation's crisis illustrates the perils of mixing a profit center trading unit with power generation and wholesaling operations.

## **Appendix: Credit and Liquidity Crises at Electricity Trading Companies 2000-2002**

The following paragraphs provide brief synopses of key events surrounding the credit ratings problems that faced several different merchant generators and wholesale power marketers with trading operations, and the resulting difficulties in continuing the trading operations. The companies covered are Dynegy, Williams, Aquila, El Paso and Mirant.

### Dynegy

Dynegy was a company very similar to Enron in history and broad areas of business, but on a smaller scale. It had started with a base in natural gas pipelines, grown into generation, and finally moved to make trading the centerpiece of its operations. In late 2001 and early 2002 a number of financial difficulties led both Standard & Poor's and Moody's to downgrade their credit ratings to one notch above investment grade. The financial press expressed concern about the threat this downgrade posed for the viability of the trading business:

'There's a risk that they could get downgraded to junk status,' said Christopher Ellinghaus, an analyst at the Williams Capital Group in New York, who cut his rating on Dynegy from strong buy to hold yesterday morning. 'It would be a pretty material event. The core trading business is very dependent on your credit rating.'<sup>14</sup>

Analysts who follow the company said the concerns that Moody's would lower its evaluation of Dynegy's credit to 'junk' status, thus imperiling its gas and power trading operations, drove the stock price lower.<sup>15</sup>

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<sup>14</sup> Berenson, Alex and Richard A. Opper Jr., "Energy Industry Shudders Again After Downgrade of Dynegy Debt," The New York Times, December 18, 2001, p.1.

<sup>15</sup> "Dynegy down again in wake of 'Alpha' inquiry," Gas Daily, Vol. 19, No. 81, April 29, 2002, p.1.

In June and July 2002 when Moody's and Standard & Poor's did downgrade Dynegy to below investment grade, both agencies mentioned that the lack of customer confidence was already hurting Dynegy's trading business.<sup>16</sup> Dynegy made several attempts to restructure itself and regain an investment grade rating so that it could continue its trading operations.<sup>17</sup> Ultimately, however, it failed to do so. Four months after losing its investment grade credit rating, Dynegy announced it was exiting the trading business.<sup>18</sup>

Thomas E. Capps, chairman and CEO of Dominion Resources, of Richmond, Va., said the announcement came as no surprise since 'Dynegy's credit is so bad that no one will trade with them.'<sup>19</sup>

A trading operation's creditworthiness matters because energy buyers and sellers want some assurance that it can meet its obligations to buy power from one company, for example, before selling it to another.<sup>20</sup>

Dynegy instead refocused its operations onto electricity generation, midstream gas operations and its regulated utility, businesses that could potentially survive the loss of the investment grade credit rating.

### Williams

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<sup>16</sup> "Moody's Downgrades Ratings of Dynegy Inc., Dynegy Holdings (Sr. Unsecured to Ba1), Illinova and Illinois Power. Ratings Outlook is Negative," Moody's Investors Service, June 28, 2002. Kennedy, John, "Dynegy Inc.'s Rating Cut to 'B+'; Still on Watch Negative," Standard & Poor's RatingsDirect, July 25, 2002.

<sup>17</sup> "Dynegy May Find a Partner to Stabilize Energy Trading," The New York Times, July 24, 2002, p. 4.

<sup>18</sup> "Dynegy Announces Restructuring, Will Exit Marketing and Trading Business," Business Wire, October 16, 2002.

<sup>19</sup> Smith, Rebecca, "Dynegy to Stop Trading Energy; President Bergstrom Resigns," The Wall Street Journal, October 17, 2002, p. B7.

<sup>20</sup> Quotation of Karl W. Miller, a senior partner at Miller McConville & Company, a private firm that invests in distressed energy assets; Glater, Jonathan D, "Dynegy Says It Will Exit the Energy Trading Business," The New York Times, October 17, 2002, p. C5.

At the start of 2001, Williams, like many of the other companies, had operations in natural gas reserves, pipelines and processing, and in electricity generation as well as energy trading. Williams was in the process of spinning off its communications and networking division.<sup>21</sup> It had sold approximately 14% of the stock in an IPO and in April 2001 distributed most of the remaining shares to complete the spin-off.<sup>22</sup> Energy trading was seen as the engine for the continued rapid growth of the firm:

Our energy marketing and trading activities provide Williams an engine for growth at rates substantially beyond increased demand for energy. Offerings from this business include services related to most energy commodities, including natural gas, electricity, natural gas liquids, crude oil and refined products. Utilizing sophisticated risk-management tools, we have pioneered structured solutions such as long-term tolling arrangements and full requirements transactions that capitalize on our commodities risk-management and trading expertise.<sup>23</sup>

In October 2001 Standard & Poor's raised William's credit rating to BBB+ from BBB, noting, among other things, that "Earnings from the nonregulated businesses have grown considerably--particularly energy marketing and trading, which now accounts for more than 40% of segment profit, up from only 3.5% in 1998. In that time, Williams has become one of the top-10 traders in gas and electricity."<sup>24</sup>

In the coming months Williams faced three critical problems. The first was the increased scrutiny of debt levels and structured financings precipitated by Enron's bankruptcy.<sup>25</sup> Williams acted relatively swiftly, announcing in December 2001 a plan to

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<sup>21</sup> The Williams Companies, Inc. 2000 Form 10-K, filed March 12, 2001, p. 3.

<sup>22</sup> "Williams Completes Spinoff of Williams Communications," Williams Press Release, April 24, 2001.

<sup>23</sup> The Williams Companies Inc., 2000 Annual Report, p. 6.

<sup>24</sup> "The Williams Companies', Units' Ratings Are Raised," Standard & Poor's RatingsDirect, October 16, 2001, p. 1.

<sup>25</sup> "Williams Companies Lists Possible Steps To Bolster Rating," The New York Times, February 5, 2002,

restructure its balance sheet using asset sales, cuts in capital expenditures, a cut in its dividend and the elimination of credit triggers in its debt.<sup>26</sup>

The second problem surfaced at the end of January 2002 when Williams was forced to delay announcement of its 4th quarter 2001 results.<sup>27</sup> In structuring the spin-off of the communications division, Williams had provided guarantees on certain debt.<sup>28</sup> As the telecommunications industry was crashing and the prospects of the newly spun-off division declined precipitously, Williams was forced to assess its liability under those guarantees.<sup>29</sup> The size of this danger caused Standard and Poor's to place Williams on a negative credit watch on February 1, 2002.<sup>30</sup> Eventually, in late February the communications company acknowledged that it was considering filing for Chapter 11, something that had been widely rumored and which weighed on Williams' stock and credit rating.<sup>31</sup> On February 27 Moody's placed Williams on watch.<sup>32</sup> In April the

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p. C2.

<sup>26</sup> "Williams Taking Steps to Further Strengthen Its Balance Sheet," Williams Press Release, December 19, 2001.

<sup>27</sup> Gilpin, Kenneth N., "Earnings Data For Quarter Is Delayed By Williams," The New York Times, January 30, 2002, p. C3.

<sup>28</sup> "Energy Trader Promises to Keep Credit Rating Up," The New York Times, January 31, 2002, p. C4.

<sup>29</sup> "Williams Companies Lists Possible Steps To Bolster Rating," The New York Times, February 5, 2002, p. C2.

<sup>30</sup> Wolinsky, Jeffrey and Judith Waite, "The Williams Companies' Ratings Placed on CreditWatch Negative," Standard & Poor's RatingsDirect, February 1, 2002, p. 1.

<sup>31</sup> Gilpin, Kenneth N., "A Spinoff of Williams May Seek Bankruptcy," The New York Times, February 26, 2002, p. C9.

<sup>32</sup> "Moody's Confirms the Williams Companies' Ratings (Baa2 Sr. Uns.), Changes Outlook to Negative," Moody's Investors Service, February 27, 2002, p. 1.

communications company did, indeed file for Chapter 11, and in May Moody's announced that Williams was a candidate for a possible downgrade of its credit rating.<sup>33</sup>

Williams was acutely aware of the threat posed to the viability of its trading operations by a possible downgrade of its credit rating below investment grade. On May 23 Williams announced that it was looking for a partner for its energy trading operations in order to preserve the rating for that business segment.<sup>34</sup> Already with its rating on negative watch the company had found its trading business drying up as counterparties hesitated to do business with it.<sup>35</sup> On May 28 Standard & Poor's lowered Williams' rating to BBB.<sup>36</sup> On June 7th Moody's followed, lowering its rating to Baa3.<sup>37</sup> On June 11 the company announced that it was revising downward its earnings forecast for the year:

...Williams said it was having trouble entering into long-term deals to sell power and to manage risk for clients because of nervousness about the company's credit rating. Although Williams expects to receive the profits from those contracts in 10 or 20 years, it books the profits in the year the deals are made, as part of the mark-to-market accounting used by all electricity traders. Now, because the company expects to conclude fewer long-term contracts, it also expects profits will decline. 'Good companies adapt to market realities,' the chief executive of Williams, Steven J. Malcolm, said yesterday in a conference

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<sup>33</sup> "Williams Prepared to Deal With Bankruptcy of Former Telecommunications Subsidiary," Williams Press Release, April 22, 2002; "Moody's Reviews the Williams Companies' Ratings for Possible Downgrade (Baa2 Sr. Uns.)," Moody's Investors Service, May 8, 2002, p. 1.

<sup>34</sup> "Williams Cos. Is Considering a Merger," The New York Times, May 23, 2002, p. C4.

<sup>35</sup> "During the second quarter, the results of the energy marketing and trading business were not profitable reflecting market movements against its portfolio and an absence of origination activities. These unfavorable conditions were in large part a result of market concerns about Williams' credit and liquidity situation and limited this business' ability to manage market risk and exercise hedging strategies as market liquidity deteriorated." - Williams Companies Inc. 2Q2002 Form 10-Q, filed August 13, 2002, p. 5.

<sup>36</sup> Wolinsky, Jeffrey and Todd A Shipman, "The Williams Companies' Ratings Lowered; Off CreditWatch," Standard & Poor's RatingsDirect, May 28, 2002, p. 1.

<sup>37</sup> "Moody's Downgrades the Williams Companies Ratings (Baa3 Sr. Uns.); Outlook Negative," Moody's Investors Service, June 7, 2002, p. 1.



call. 'The credit confidence is gone. There are few counterparties willing to enter into long-term agreements.'<sup>38</sup>

The company therefore announced it was scaling back its trading operations.<sup>39</sup>

On July 23 and 24 Williams was hit with announcements from both Standard & Poor's and Moody's, respectively, that its credit rating was being lowered below investment grade. Standard & Poor's initially lowered it to BB+, while Moody's lowered it to B1.<sup>40</sup> Standard & Poor's then lowered it again, on July 25th, to B+.<sup>41</sup>

Being downgraded below investment grade doubled the problems for Williams. Not only was it undercut by the loss of revenue from counterparties unwilling to trade with it, but now each trade it did execute required additional access to capital to back it up.

Williams' energy risk management and trading business also relied upon the investment-grade rating of Williams' senior unsecured long-term debt to satisfy credit support requirements of many counterparties. As a result of the credit rating downgrades to below investment grade, Energy Marketing & Trading's participation in energy risk management and trading activities requires alternate credit support under certain existing agreements. In addition, Williams is required to fund margin requirements pursuant to industry standard derivative agreements with cash, letters of credit or other negotiable instruments. As a result of Williams credit downgrade to non-investment grade during 2002, Williams is effectively required to post margins of 100 percent or more on forward positions which result in a loss.<sup>42</sup>

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<sup>38</sup> "Williams Sharply Cuts Annual Forecast," The New York Times, June 11, 2002, p. C2.

<sup>39</sup> "Williams Sharply Cuts Annual Forecast," The New York Times, June 11, 2002, p. C2.

<sup>40</sup> Wolinsky, Jeffrey and Todd A Shipman, "The Williams Companies and Subsidiaries Downgraded: On CreditWatch Negative," Standard & Poor's RatingsDirect, July 23, 2002, p. 1; "Moody's Downgrades the Williams Companies' Ratings (To B1 Sr. Uns.); Ratings Under Review for Possible Further Downgrade," Moody's Investors Service, July 24, 2002, p. 1.

<sup>41</sup> Wolinsky, Jeffrey and Todd A Shipman, "Research Update: Williams Companies Inc. (The)," Standard & Poor's RatingsDirect, July 26, 2002, p. 1.

<sup>42</sup> Williams Companies Inc. 2002 Form 10-K, filed April 3, 2003, p. 28 and 82.

The company said this week it has \$450 million cash and about \$700 million in available credit. It owes \$800 million in debt payments this month and next. A downgrade to junk would require Williams to raise an additional \$400 million to \$600 million to finance its trading unit, the company said.<sup>43</sup>

The company's losses in trading therefore mounted, and the company's search for a partner received a new push and the company began to consider selling the business.<sup>44</sup> By December the company had significantly pared its trading operations, and by March 2003 it had made the decision to close them down entirely.<sup>45</sup>

### Aquila

In 2000 Aquila was the very successful energy trading arm of UtiliCorp, a Kansas City, Missouri based electricity company. Like Enron, energy trading at Aquila grew out of its long standing business as a natural gas marketer.<sup>46</sup> Aquila expanded energy trading to take advantage of the opening up of deregulated electricity and energy markets.<sup>47</sup> In 2000 and 2001 UtiliCorp weighed different corporate structures with the intention of dramatically expanding Aquila's energy trading business. In December of 2000 UtiliCorp announced a plan to spin-off Aquila starting with an IPO for 20% of the shares in April 2001.<sup>48</sup>

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<sup>43</sup> "Williams Cos. debt downgraded third time," The Journal Record, July 25, 2002, p. 1.

<sup>44</sup> Williams Companies Inc. 3Q2002 Form 10-Q, filed November 14, 2002; Williams Companies Inc. 2Q2002 Form 10-Q, filed August 13, 2002; and "Tulsa, Okla.-Based Energy Company Reportedly Lands \$1 Billion Loan," KRTBN Knight-Rider Tribune Business News, August 1, 2002.

<sup>45</sup> Williams Companies Inc. 2002 Form 10-K, filed March 19, 2003, p. 52.

<sup>46</sup> UtiliCorp United Inc. 2000 Form 10-K, filed March 26, 2001, p. 3.

<sup>47</sup> Aquila Inc. Prospectus, filed April 25, 2001, p. 2.

<sup>48</sup> UtiliCorp United Inc. 2000 Form 10-K, filed March 26, 2001, p. 6.

However, changing conditions in the wholesale energy market quickly overtook this business plan. One element was the higher cost being charged for the credit backing the risky trading operations. It was too expensive for the trading business to maintain its investment grade credit rating without the backing of the safe, tangible assets located in the parent company. In November 2001 UtiliCorp announced it was reversing course, canceling the plans to sell the remaining shares and thus complete the spin-off, and, in fact, UtiliCorp now intended to remerge Aquila and its trading business back into the parent company.<sup>49</sup>

Despite this restructuring, UtiliCorp ran immediately into new difficulties in maintaining its investment grade credit rating. The company's first quarter 2002 earnings dropped sharply and its cash from operations fell short of its investment needs.<sup>50</sup> At the same time, its acquisition of the independent power producer Cogentrix Energy had a further negative effect on Utilicorp's coverage ratios and other indicators of credit quality. On April 30, Standard & Poor's placed the company on a negative credit watch.<sup>51</sup> On May 20 Moody's did the same.<sup>52</sup>

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<sup>49</sup> "UtiliCorp Plans Exchange Offer for the 20% of Aquila It Does Not Own; Citing Success of Aquila's Growth Strategy, Says It Will Adopt the Aquila Name," Business Wire, November 7, 2001. At this point in time, the parent UtiliCorp also chose to rename itself Aquila. However, to avoid the obvious confusion, in the remainder of this section I continue using the name UtiliCorp for the parent or combined entity and Aquila for the trading operations only.

<sup>50</sup> "Aquila announces \$.32 first Quarter EPS; Conference Call And Webcast Set for 1:00 P.M. Eastern Time Today," Business Wire, May 1, 2002, p. 1.

<sup>51</sup> Shipman, Todd A, "Research Update: Aquila Inc.," Standard & Poor's RatingsDirect, April 30, 2002, p.1.

<sup>52</sup> "Moody's Places Aquila Inc. and Aquila Merchant Services Inc. Under Review for Possible Downgrade," Moody's Investor Service, May 20, 2002, p. 1.

The day after Moody's action, Utilicorp announced a paring down of its trading operations as one step to improving its credit rating.<sup>53</sup> By June the company found itself forced to go further still and announce a major strategic repositioning involving a largescale reduction in its trading operations.<sup>54</sup> Nevertheless, the company was still unable to resolve its deteriorating financial position, and in September and November Standard & Poor's and Moody's, respectively, lowered the company's credit rating to below investment grade.<sup>55</sup> By the time the company published its annual report for 2002 it was stating simply that it had exited from the trading business entirely, transforming itself exclusively into a regulated utility business and non-regulated power generation business.<sup>56</sup>

### El Paso

The El Paso Corp was another company that had followed a path similar to Enron's, growing beyond natural gas production into electricity generation and energy trading. However, in 2002 the company was struck by a number of adverse events. The company was accused by an administrative law judge at the Federal Energy Regulatory Commission of restricting natural-gas supplies into California and thus manipulating prices in the West.<sup>57</sup> El Paso also found itself caught in the spotlight on off-balance-sheet

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<sup>53</sup> "Update 1-Aquila seeks to reassure investors," Reuters News, May 21, 2002.

<sup>54</sup> "Aquila Announces Strategic and Financial Repositioning; Reduces Dividend, Earnings Guidance and Wholesale Activity, Plans to Raise \$900 Million by Equity and Debt Offerings," Business Wire, June 17, 2002, p. 1.

<sup>55</sup> Sharma, Rajeev, "Research Update: Aquila Inc.," Standard & Poor's RatingsDirect, November 19, 2002, p. 1; "Moody's Downgrades Aquila, Inc. and Aquila Merchant Services to Ba2," Moody's Investors Service, September 3, 2002, p. 1.

<sup>56</sup> Aquila, Inc. 2002 Form 10-K, filed April 11, 2003, p 3 and 4.

<sup>57</sup> Barrionuevo, Alexei and Mitchel Benson, "Leading the News: Judge Says El Paso Withheld Gas Into California," The Wall Street Journal, September 24, 2002, p. A3.

structured transactions created by the revelations at Enron.<sup>58</sup> Investigations into the fraudulent reporting of energy trades by a number of energy companies brought El Paso under suspicion, too. In addition, one of El Paso's major shareholders pursued a public battle opposing certain spin-offs of electricity supply contracts.<sup>59</sup> El Paso's profitability was also a victim of the decline in liquidity in energy trading markets. Finally, El Paso suffered under the general deterioration of the wholesale power market.<sup>60</sup> Throughout 2002 the company's stock price declined.

El Paso took a number of significant actions to restructure its balance sheet, improve liquidity and defend its credit rating. These included new debt and equity financings as well as asset sales. In May 2002 one of the steps the company took was a sharp reduction in the size of its trading operations.<sup>61</sup> This would reduce the exposure to risk and the amount of capital required to back the business.

Nevertheless, bad news continued. On September 23 Standard and Poor's put El Paso on a negative credit watch.<sup>62</sup> The next day Moody's took the same step.<sup>63</sup> On October 2 Moody's went further and actually announced a downgrade from Baa2 to

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<sup>58</sup> Smith, Randall and Jathon Sapsford, "Debt Triggers Spark Worries Due to Enron," *The Wall Street Journal*, February 15, 2002, p. C1.

<sup>59</sup> Cummins, Chip and Alexei Barrionuevo, "Leading the News: El Paso Investors Question Booking Of Power Contracts," *The Wall Street Journal*, July 23, 2002, p. A3.

<sup>60</sup> Barrionuevo, Alexei, "El Paso Posts \$45 Million Loss On Weak Markets, Low Prices," *The Wall Street Journal*, August 9, 2002, p. A5.

<sup>61</sup> "El Paso Corporation Announces Strategic Repositioning," El Paso Press Release, May 29, 2002, p. 1.

<sup>62</sup> Ferara, William and John W Whitlock, "El Paso Corp. Placed on Watch Neg Re: FERC Ruling," *Standard & Poor's RatingsDirect*, September 23, 2002, p. 1.

<sup>63</sup> "Moody's Places El Paso Corporation's Debt Ratings under Review for Possible Downgrade (Baa2 Senior Unsecured)," *Moody's Investors Service*, September 24, 2002, p. 1.

Baa3, the lowest investment grade rating. Moody's also left El Paso on negative credit watch for further downgrade.<sup>64</sup> The declining credit ratings forced El Paso's hand on its trading operations. The company's trading counterparties required more collateral on trades, consuming cash that had been raised for the purpose of lowering the company's outstanding debt. On November 8 the company was forced to report another quarter of losses and it announced that it was exiting the trading business entirely.<sup>65</sup> By the end of the month the company's credit ratings were lowered to below investment grade.<sup>66</sup>

### Mirant

Mirant had originally been a subsidiary of the Southern Company, a major southeastern electric utility, containing much of Southern's unregulated wholesale electric generating business and its energy trading business. Southern initiated a spin-off of Mirant with an IPO in September 2000 and a final distribution of the remaining shares it held in April 2001. Mirant projected an ambitious growth plan, including the dramatic expansion of energy trading.<sup>67</sup> The IPO was very successful and the company's stock price was initially very high. However, from May 2001 the company's stock began what proved to be a long downward slide. Mirant found itself caught in the contradiction between its extremely ambitious expansion plans and the still weak economy and weakening wholesale power market. Other factors, too, contributed. Mirant found itself

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<sup>64</sup> "Moody's Downgrades Debt Ratings of El Paso Corporation (Senior Unsecured to Baa3); Ratings Remain under Review for Possible Further Downgrade," Moody's Investors Service, October 2, 2002, p. 1.

<sup>65</sup> The company's 2002 Form 10-K explains: "Our credit downgrades in the third and fourth quarter and a further deterioration of the energy trading environment led to our decision in November 2002 to exit the energy trading business and pursue an orderly liquidation of our trading portfolio" (p. 56).

<sup>66</sup> "Moody's Downgrades Debt Ratings of El Paso Corporation (Senior Unsecured to Ba2); Outlook Negative," Moody's Investors Service, November 26, 2002, p. 1; Ferrara, William, "El Paso Corp. Ratings Lowered to 'BB'; Still Watch Negative," Standard & Poor's RatingsDirect, December 2, 2002, p. 1.

<sup>67</sup> Mirant Corp. 2000 10-K, p. 4.

forced to reverse course and pull out of its India operations.<sup>68</sup> It faced allegations of price manipulation in California. When, in late 2001, Enron ultimately collapsed, Mirant was one of several energy companies facing additional scrutiny over the size of their debt load.<sup>69</sup>

On December 19, 2001 Moody's lowered Mirant's credit rating to Ba1, which is below investment grade.<sup>70</sup> Although Standard & Poor's rating remained investment grade, Moody's downgrade immediately forced Mirant to post additional collateral on many of its transactions. According to Mirant's 10k the \$323 million shift in net collateral from \$45 million positive in 2000 to \$278 million negative in 2001 was primarily due to the credit rating downgrade.<sup>71</sup>

Mirant was immediately forced to consider steps to restructure its balance sheet and restore its credit rating, including, for example, the sudden sale of new equity.<sup>72</sup> Throughout 2002 Mirant wrestled with the problem of the size of its expanded trading operations and the credit they required. As a Salomon Smith Barney analyst noted, "Mirant's current credit ratings (non-investment grade status at Moody's, one level above

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<sup>68</sup> "World Business Briefing Asia: India: Energy Concern Pulls Out", New York Times, December 14, 2001.

<sup>69</sup> "Moody's Lowers Mirant's Credit Rating As Energy Industry Faces Stiffer Standards", Wall Street Journal, December 20, 2001.

<sup>70</sup> "Moody's Downgrades Mirant, MAEM, and MAGI to Ba1 and Places MIRMA on Review for Possible Downgrade", Moody's Investor Services, December 19, 2001.

<sup>71</sup> Mirant Corp. 2001 10-K405/A, pp. 35 and 33.

<sup>72</sup> "Mirant's Stock Sale Draws \$759 Million; S&P Rating Stands", The Wall Street Journal, December 21, 2001.

non-investment grade status at Standard and Poor's) effectively impair its ability to trade and market energy on a profitable basis.”<sup>73</sup>

Mirant initially pursued the option of creating a separately capitalized subsidiary for trading with the target of obtaining an A- rating for the subsidiary. The idea was modeled on the Derivative Product Companies that some investment banks had created in the early 1990s in order to obtain the high credit ratings that specific portions of trading operations required.<sup>74</sup> However, as progress on that option was slow in coming, in September 2002 Mirant was forced to announce a reduction in its energy trading operation.<sup>75</sup>

Despite its efforts to pare back capital expenditures, trading operations and otherwise restructure, Mirant was hit with a second set of downgrades in October 2002. On the 10th Moody's announced a further downgrade to B1.<sup>76</sup> Later the same day Mirant described actions that it was taking in response to the Moody's downgrade.

"We're disappointed in this action, but not surprised," said Ray Hill, chief financial officer, Mirant. "We've moved aggressively to strengthen liquidity and reduce trading and marketing activity to ensure that our business is able to service customers despite rating agency actions. Ratings downgrades do not trigger any default or acceleration of debt obligations for Mirant, but they could require us to post additional collateral. We previously estimated this to be in the

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<sup>73</sup> Niles, Raymond C. and Brian Chin, "Mirant (MIR): Conf. Call Masks Underlying Concerns; Maintain 4H," Salomon Smith Barney, June 25, 2002, p. 3.

<sup>74</sup> See Satyajit Das, *Swaps/Financial Derivatives – Products, Pricing, Applications and Risk Management*, 3rd edition, Singapore: John Wiley & Sons (Asia) Pte Ltd, 2004, pages 1181-1217 and articles cited there. See also Eli M. Remolona, William Bassett, and In Sun Geoum, *Risk Management by Structured Derivative Product Companies*, Federal Reserve Bank of New York Economic Policy Review, April 1996, pp. 17-37.

<sup>75</sup> "Mirant Plans Energy Trading, Capital Spending Cuts - CEO", Dow Jones Energy Service, September 19, 2002.

<sup>76</sup> "Moody's Downgrades Mirant Corporation (Sr. Unsec. To B1), Mirant Americas Generation, Inc., Mirant Americas Energy Marketing, L.P. and Mirant Mid-Atlantic, LLC. Ratings Outlook is Negative." Moody's Investor Services, October 10, 2002.



range of \$300 million -- a very manageable amount compared to our current liquidity of \$1.7 billion. ...”<sup>77</sup>

Then on the 21st Standard & Poor’s lowered Mirant’s rating from above to below investment grade, setting the rating at BB.<sup>78</sup>

The flow of bad news continued. On December 20, 2002 Mirant reported a loss for the 3rd quarter as a result of write-downs related to the cancellation of projects and the sale of its gas production company. It also announced the sale of assets in China in an attempt to boost liquidity.<sup>79</sup> On February 25, 2003 Mirant postponed the analyst call scheduled to announce 2002 earnings to allow time for the reaudit of financials from earlier years to be completed.<sup>80</sup> On April 30 Mirant announced a loss of \$2.4 billion for 2002.<sup>81</sup> The poor performance and an inability to restructure debt caused Mirant to file for bankruptcy on July 14, 2003.<sup>82</sup>

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<sup>77</sup> “Mirant Affirms Liquidity Position in Response to Moody's Downgrade”, Mirant Corp. Press Release, October 10, 2002.

<sup>78</sup> “Mirant Corp.'s, Units' Ratings Cut to Noninvestment Grade; Outlook Negative”, Standard & Poor’s, October 21, 2002.

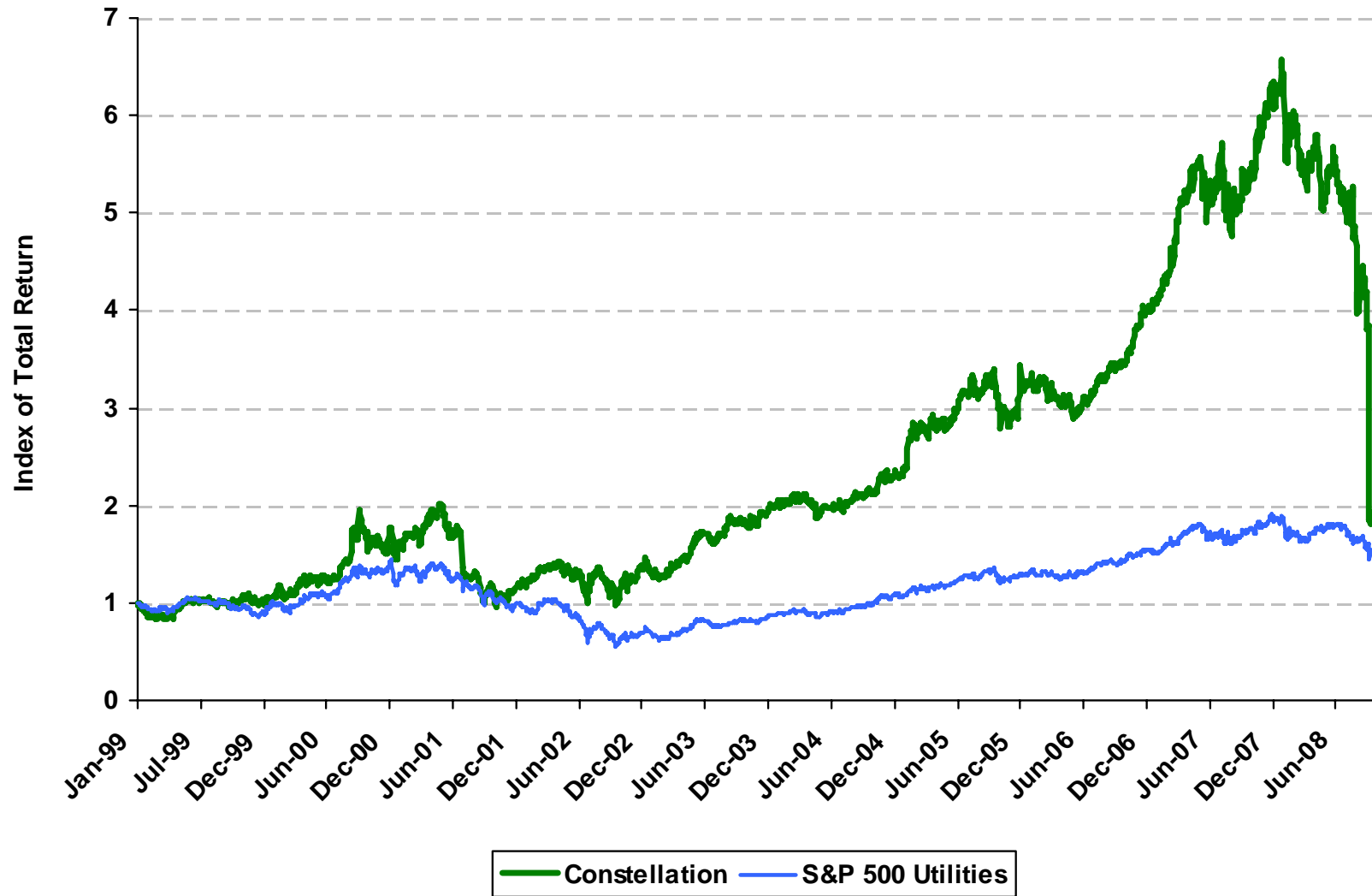
<sup>79</sup> “Mirant Reports Third Quarter Results”, Mirant Corp. Press Release, December 20, 2002; “Mirant Sells Interest in Chinese Asset for \$300 Million”, Mirant Corp. Press Release, December 31, 2002.

<sup>80</sup> “Mirant Delays Analysts Call”, Mirant Corp. Press Release, February 25, 2003.

<sup>81</sup> “Mirant Reports 2002 Results, Completes Reaudits”, Mirant Corp. Press Release, April 30, 2003.

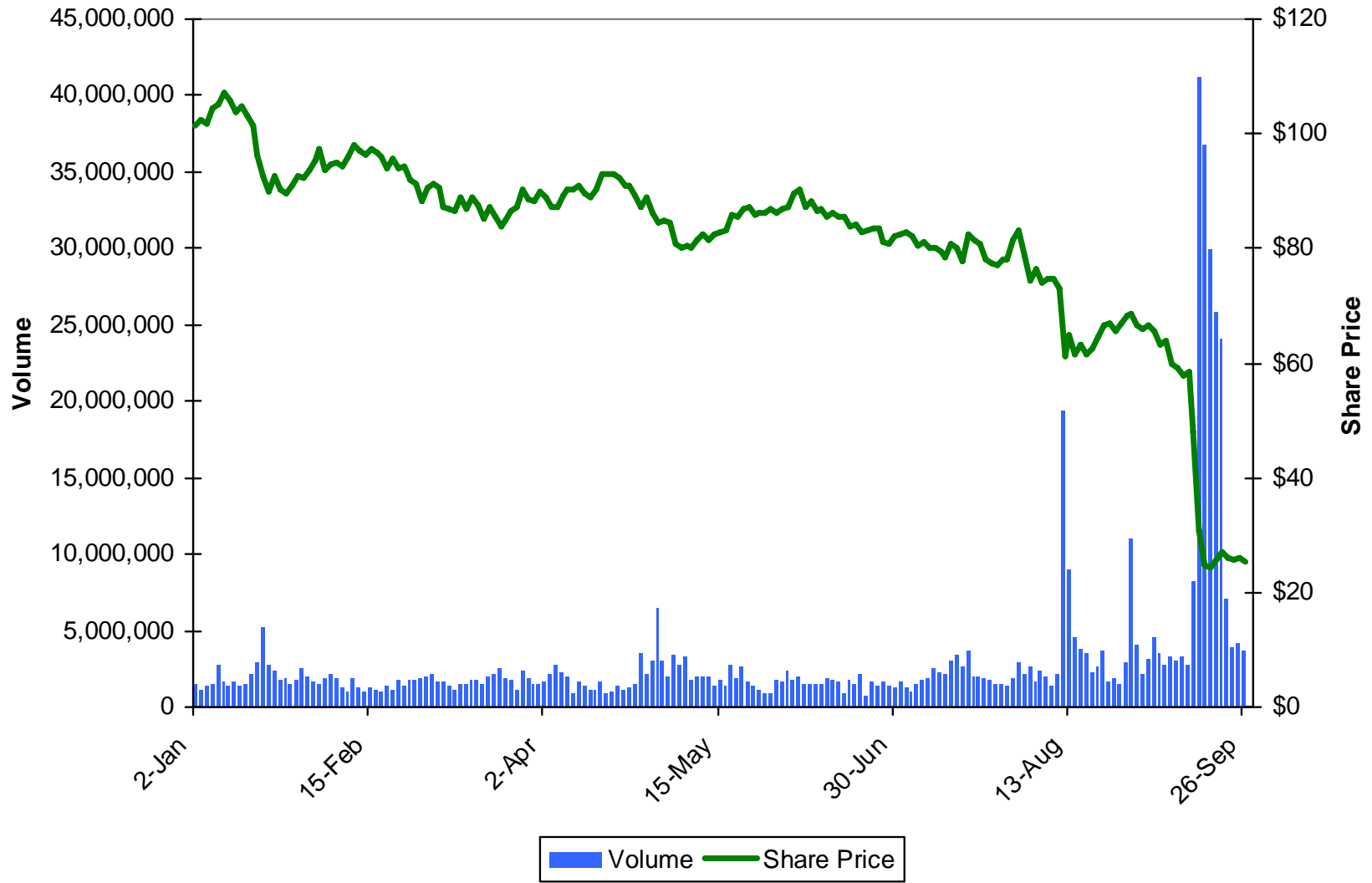
<sup>82</sup> “Mirant Files Chapter 11 Petitions to Facilitate Financial Restructuring”, Mirant Corp. Press Release, July 14, 2003.

Figure 1: Relative Stock Performance



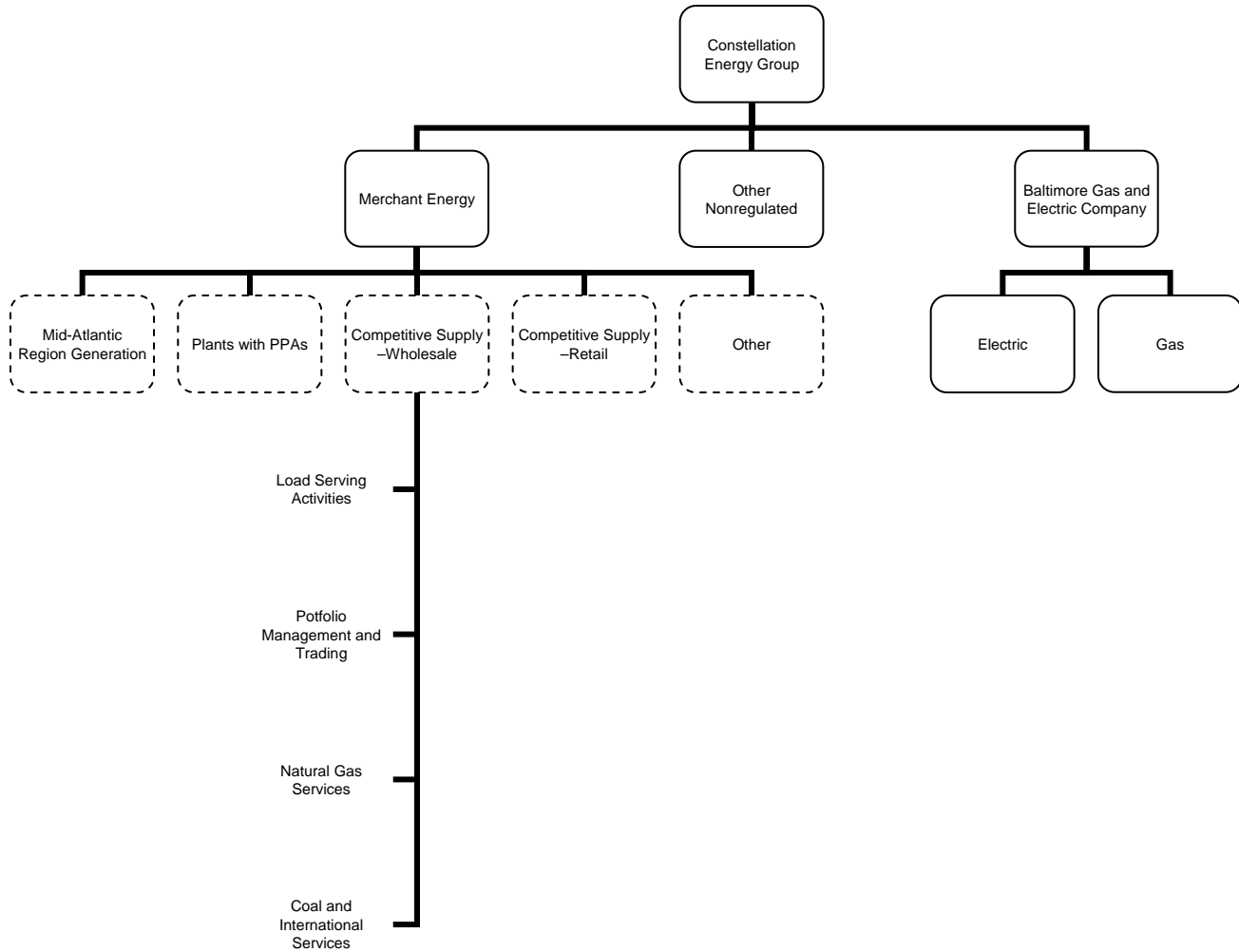
Source: "CRSP.

**Figure 4: Constellation 2008 Share Price & Volume**



Source: "CRSP.

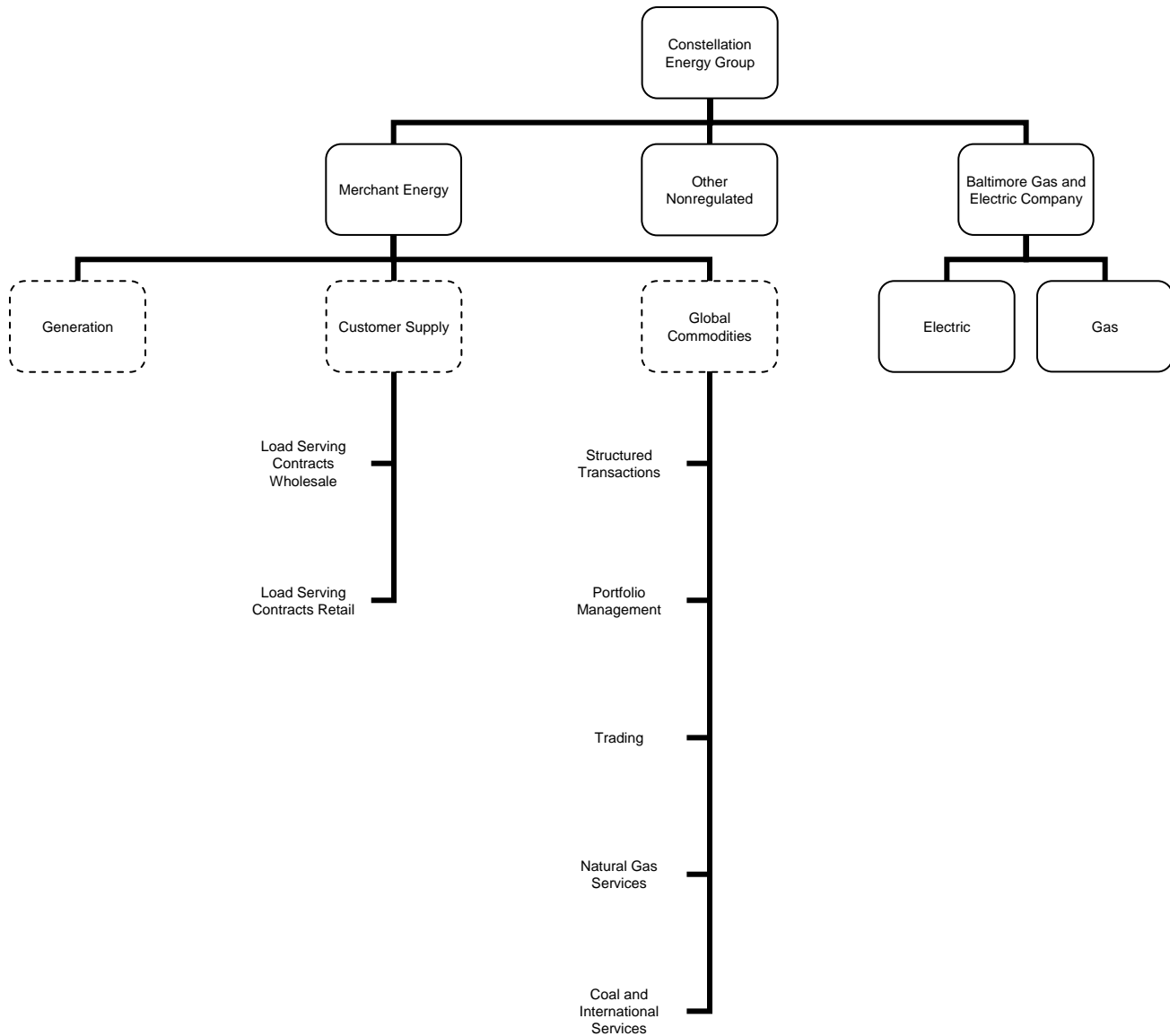
**Figure 2: Constellation Financial Reporting Structure, Year-end 2006**



Source: Constellation Energy Group Form 10-K for 2006.

Note: Boxes with solid lines represent units that Constellation formally reports as distinct Operating Segments with individually identified revenues, net income and assets. Boxes with dashed lines represent units for which Constellation reports only separate revenues and gross margins. Unboxed units represent the structure Constellation employed in discussing the units, but for which no separate breakdown of activities is available.

**Figure 3: Constellation Financial Reporting Structure, 1<sup>st</sup> & 2<sup>nd</sup> Quarter, 2008**



Source: Form 10-Qs for first and second quarters 2008 as well as Analyst Presentations.

Note: Boxes with solid lines represent units that Constellation formally reports as distinct Operating Segments with individually identified revenues, net income and assets. Boxes with dashed lines represent units for which Constellation reports only separate revenue and gross margins. Unboxed units represent the structure Constellation employed in discussing the units, but for which no separate breakdown of activities is available. These designations do not appear in the Form 10Qs but correspond to discussions in presentation of results, e.g., "Deutsche Bank Energy & Utilities Conference" presentation by Tom Brooks, President Constellation Energy Resources, May 28, 2008. Labels have been chosen to maintain consistency with the 2006 chart.

**Table 1: Unit Value-at-Risk for Key Physical Trades**

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Date	Nymex Gas	PJM West	
		Peak Power	Nymex Coal
12/31/2006	\$0.73	\$5.42	\$1.52
12/31/2007	\$0.53	\$4.56	\$1.60
3/31/2008	\$0.75	\$5.27	\$6.86
6/30/2008	\$0.83	\$6.41	\$7.94
7/31/2008	\$0.97	\$7.96	\$15.04

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Source: "Constellation Energy 2008 Analyst Meeting Supporting Materials," August 27, 2008.