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# Do trading and power operations mix? The case of Constellation Energy Group in 2008

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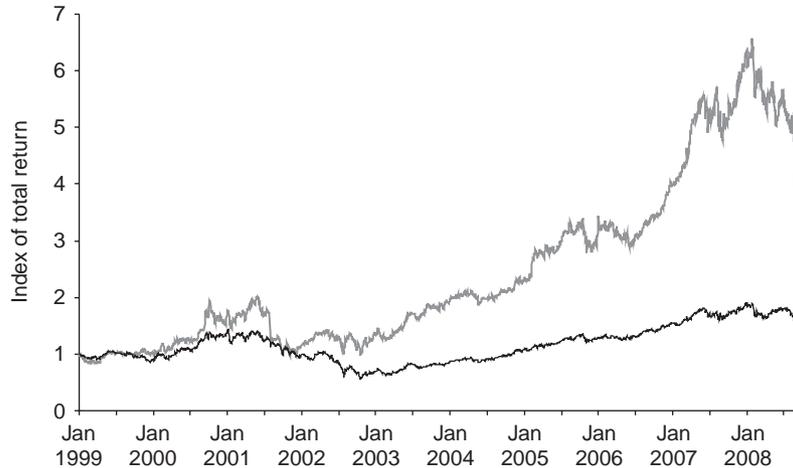
*For the first seven years following its creation in 2000, Constellation Energy Group was a leader in the merchant power business, and its stock significantly outperformed the industry. Then, in 2008, in the space of less than two months, the company found itself in a liquidity crisis in which its stock lost more than 70% of its value, leading to a forced sale at a low price. What happened? 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, which increases the danger of potentially large contingent capital requirements. These are often overlooked in traditional value-at-risk calculations. It is therefore easy to underestimate exposure and the 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 at zero cost. 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, separate from the other operations.*

## 1 INTRODUCTION

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

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This is a shorter version of a working paper that is available online with more extensive details on Constellation and on the events in 2008. See <http://web.mit.edu/ceepr/www/publications/workingpapers/2008-014.pdf>.

**FIGURE 1** Relative stock performance of Constellation versus S&P 500 utilities.

Gray line: Constellation. Black line: S&P 500 utilities.

The easy answer focuses on an unfortunate confluence of events. The commodity price spike in 2007–8 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 could not be obtained 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 initial years of Constellation’s 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 trading a separate profit center and put trading at the center of 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 whole company.

We have been through this before. In 2001–2 profit center trading operations at several US power companies were shut down when events in the market suddenly exposed the large amount of capital required to run the business, shattering the mistaken belief that these operations were driving profitability.

There are lessons to be learned 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 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 highly illiquid positions in physical assets. This illiquidity undermines the relevance of tools such as value-at-risk (VaR) that assume a position can be sold quickly. Reliance on VaR leads to significant underestimation of the complicated contingent capital requirements that arise with illiquid physical positions. Management generally underestimates the equity capital required to back 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 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 nontrading 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 should get the credit for profit earned in generation and customer supply: how much of the profit earned from a sale is attributable to the generator and how much to the trader? 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, trading can be a profit center, but then it must be truly separated from other business units, so that it is forced to rely on its own balance sheet and its profitability can be reliably measured.

The Constellation case presents these lessons in stark relief. Section 2 describes the history of Constellation from 2000 through 2006, when the trading operation was organized to support generation and customer supply. 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 upon an earlier set of cases in the US electric power industry that we maintain reflect the same problems. To present the Constellation case study, we rely exclusively on publicly available documents from the company itself, as cited throughout the paper. Hence, we are taking the company's own representations at face value, but reading them using a different theoretical lens, and with 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 to then take this explanation and to evaluate its 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**

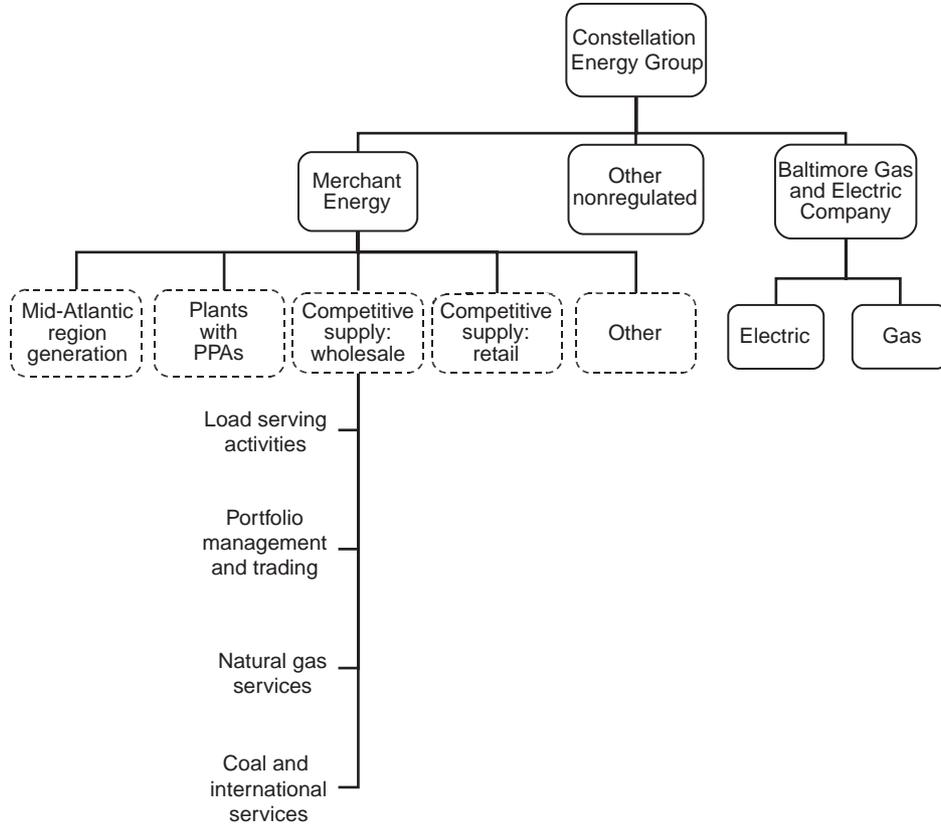
Constellation grew out of the Baltimore Gas and Electric (BGE) company, a traditionally regulated electric and gas utility serving customers in the area of Baltimore, MD. In 1999, Maryland passed restructuring legislation enabling competition among electricity suppliers. In response, BGE reorganized itself. Constellation 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", which had two dominant lines of business: power generation and customer supply. The company moved aggressively and successfully to grow its merchant business in a competitive electricity market within and beyond its original territory.<sup>1</sup>

Constellation's trading operation supported this merchant business.<sup>2</sup> Trading managed the purchase of fuels and the sale of power for the generating units, sourced

<sup>1</sup> The material in this section is based on the discussions in Constellation's various 10-K forms through year-end 2006, including Baltimore Gas and Electric Company (1999).

<sup>2</sup> Over the years, Constellation used a changing set of labels for what we term the trading operations. These have included, among others, risk management and portfolio management. In this paper, we 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. Our 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 we call "proprietary trading", ie, 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 we mean to speak of proprietary trading as opposed to other types of trading, we specifically say so.

**FIGURE 2** Constellation financial reporting structure, year-end 2006.



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. Source: Constellation Energy Group (2007b).

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 10-K form reported separate profit figures for generation, customer supply and 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 Constellation’s financial reporting structure as of 2006.

How does trading support the generation and customer supply businesses? Let us take as an example the needs of Constellation's major customer channel, local utilities that 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.

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. Also, 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 price its services better.

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. The trading unit also 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 information technology departments fulfill support functions. Trading helps to maximize the margin earned supplying load and generating power. The margins earned by each of these businesses 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 2007–8**

In January 2007, Constellation management premiered a new organizational structure for its merchant units as shown in Figure 3 on page 11 (Constellation Energy Group (2007a)). 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 and investing". It eventually titled it "Global Commodities". Global Commodities consisted of:

- (1) risk management services provided to Constellation's own generation and customer supply units;
- (2) structured products, which were risk management services marketed outside the firm;
- (3) a proprietary trading portfolio;

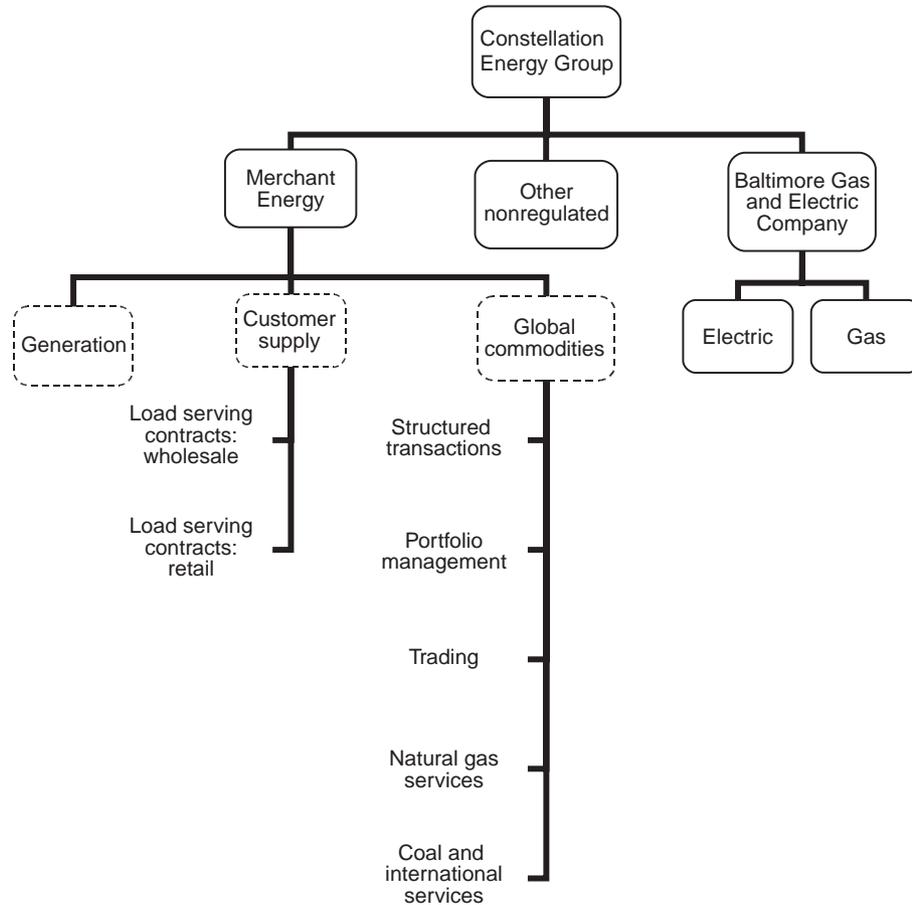
- (4) energy investments, which included direct investments in upstream natural gas production, bulk shipping and coal supply (Constellation Energy Group (2008a,c,d)).

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 inward-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 from 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 about which it thinks 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 (see, for example, Constellation Energy Group (2007a, p. 32)). This explains the curious fact that what appeared to be fundamentally hard-asset businesses, comparable in other regards to the separate electric generation unit, were consolidated under the trading operation. The value of 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.

When Constellation introduced its newly independent trading unit, it compared this profit center business against banks like Bear Stearns, Goldman Sachs and Lehman Brothers (Constellation Energy Group (2007a, pp. 63, 91)). 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

**FIGURE 3** Constellation financial reporting structure, first and second quarter, 2008.

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 10-Q forms but correspond to discussions in presentation of results, eg, "Deutsche Bank Energy and Utilities Conference" presentation by Tom Brooks, president of Constellation Energy Resources, May 28, 2008. Labels have been chosen to maintain consistency with the 2006 chart. Source: Constellation Energy Group (2008a,c,d,e).

support the new unit at between US\$900 million and US\$1.1 billion, and forecasted 2007 earnings before interest, taxes, depreciation and amortization for this business of US\$342 million. This implied an extraordinary 31% rate of return on equity, which Constellation's management was proud to advertise (Constellation Energy Group (2007a, pp. 19, 31–32, 64)). This was an outrageous forecast. It should have been

**TABLE 1** Unit VaR for key physical trades.

Date	NYMEX gas	PJM West peak power	NYMEX coal
December 31, 2006	0.73	5.42	1.52
December 31, 2007	0.53	4.56	1.60
March 31, 2008	0.75	5.27	6.86
June 30, 2008	0.83	6.41	7.94
July 31, 2008	0.97	7.96	15.04

All values in US dollars. Source: "Constellation Energy 2008 Analyst Meeting Supporting Materials", August 27, 2008. "NYMEX" stands for New York Mercantile Exchange.

*prima facie* evidence that the unit's capital requirement was seriously underestimated, and a portent of the disaster to come.

The unit's proprietary trading portfolio expanded rapidly. Constellation reported that the VaR on the small proprietary trading portfolio it had maintained in 2004, measured as the 99% confidence bound on a one-day holding period loss, was only US\$2.6 million. Now, with the reorganization, the size of Constellation's exposure grew significantly. By year-end 2007 the VaR had grown to US\$11 million, which is an annual average growth rate of 62%. In 2004, the gross margin on proprietary trading and related activities was only US\$93 million. By 2007 this had grown to US\$435 million, which is an annual average growth rate of 67% (see Constellation Energy Group (2007a, p. 95; 2008a)). Constellation also significantly expanded the new trading unit's 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. A measure of VaR per physical unit is relevant for a company managing a physical commodities business since the company is not free to scale its positions in dollar terms as a company managing a purely financial portfolio would. This is one of the distinguishing features of a commodity company that traders schooled in financial institutions overlook. The rise in VaR in 2007–8 is remarkable. This translated into increasing collateral requirements in order to continue in business, straining the company's liquidity.

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 (Constellation Energy Group (2008c,e)).

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 to below investment grade. At year-end 2006 this figure stood at US\$1.288 billion. At year-end 2007 it was US\$1.336 billion. During the first quarter of 2008 this more than doubled to US\$3.234 billion. During the second quarter of 2008 it increased by another US\$1.336 billion to a total of US\$4.570 billion (see Constellation Energy Group (2008a, p. 27; 2008c, p. 26)).

These figures swamped Constellation's available sources of liquidity. The news release in August 2008 sparked market speculation that Constellation would not be able to meet such a call, driving down its stock price. This, in turn, 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, including the upstream natural gas assets and a sizeable fraction of its coal business.

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 one-day holding period. In its 10-K form it also reported the VaR calculated assuming a ten-day holding period (see, for example, Constellation Energy Group (2008b)). These turned out to be completely inadequate measures of the company's total exposure since the underlying commodity portfolio was much less liquid than these calculations assumed. Consequently, the whole company was forced into a fire sale. In mid-September 2008 it negotiated an emergency cash injection of US\$1 billion from Warren Buffett's Mid-American Energy Holdings. The price

extracted was the sale of the entire company for just US\$4.7 billion or US\$26.50/share (Constellation Energy Group (2009)). Less than two months before this, the stock had been selling for US\$82/share.

While Mid-American did provide the cash that solved Constellation's immediate liquidity crisis, another investor, the French utility EDF, stepped in to buy out Mid-American before the sale ultimately closed. EDF was already a major shareholder in Constellation and had a stake in a nuclear joint venture with the company. EDF received a 50% stake in Constellation's nuclear generating units in exchange for US\$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. The stand-alone components of its trading operation, including natural gas, coal and the proprietary trading portfolio, had since been sold, leaving a trading operation that once again served a support function role for Constellation's generation and customer supply businesses. 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 was not just the trading operation that had to be sold at a discount: it was the whole 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 the subsequent transaction between EDF and Constellation, in which EDF purchased a 50% stake in Constellation's nuclear generating units, as a benchmark for the fair value of Constellation's generating assets. The cost to EDF was approximately US\$4.7 billion, implying that the nuclear assets alone were worth more than US\$9.4 billion. The other generating assets and the customer supply business should have raised the value higher still. This gives us a floor on the value of Constellation absent a separate profit center for trading. However, in September 2008, the liquidity crisis that originated from the trading operation forced the company as a whole to sell itself to Mid-American Energy Holdings for just US\$4.7 billion, less than half the value of the nontrading 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. Value-at-risk models underestimate the contingent capital required for commodity trades because they ignore or minimize the illiquidity of the physical positions. Moreover, when trading shares a balance sheet with other lines of businesses, such as generation, the full scale of capital required for trading is hidden because trading effectively borrows capital from the other businesses at no cost. Particularly when trading is promoted to the centerpiece of a company's strategy, the

trading operation often claims a 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>3</sup> Coincident with the exposure of the fraud at Enron in 2001, 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 confront the scale of capital required for trading. Previously, when the companies had maintained an investment grade credit rating, counterparties would trade with them without demanding collateral. Now, without an investment grade credit rating, counterparties demanded collateral, so each trade placed an explicit demand on the company's balance sheet. Suddenly, trades that had looked profitable before, when the capital needed to back them was not explicitly itemized, no longer looked profitable. 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 look so good. Consequently, the trading operations closed down their proprietary portfolios and stopped being profit center business units. Instead, the trading operations were reoriented to serving a support function for the generation and customer supply units.

Constellation's crisis reprised this lesson. Its decision to turn the trading operation into a profit center and place it at the center of its growth strategy was predicated on an underestimate of the contingent capital exposure on trading's lines of business. The surprising events of 2007–8 exposed this mistake, quickly producing capital requirements that far exceeded what had been anticipated and beyond 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 that was 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.

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<sup>3</sup> Here we provide our summary of the common element across the set of five company histories. In Appendix A we provide additional detail and sourcing on the specific events for each company.

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 run profit center trading operations. A good example is 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 liquefied natural gas 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 and petroleum, but also in metals. Sempra's commodities trading unit had its origins in Drexel, Burnham and Lambert, and AIG Trading Corporation. While a part of Sempra, it was evaluated on the basis of its own profitability. Up to 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 (RBS), 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 A: 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 following the exposure of fraud at Enron in 2001 and the coincident collapse of wholesale electricity prices, and the resulting difficulties in continuing their trading operations. The companies covered are Dynegy, Williams, Aquila, El Paso and Mirant.

### **A.1 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."

Berenson and Oppel (2001, p. 1)

Furthermore:

Analysts who followed the company said the concerns that Moody's would lower its evaluation of Dynegy's credit to "junk" status, thereby imperiling its gas and power trading operations, drove the stock price lower.

*Gas Daily* (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 (Moody's Investors Service (2002e) and Kennedy (2002)). Dynegy made several attempts to restructure itself and regain an investment grade rating so that it could continue its trading operations (*New York Times* (2002e)). Ultimately, however, it failed to do so. Four months after losing its investment grade credit rating, Dynegy announced it was exiting the trading business (*Business Wire* (2002c)). Furthermore:

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"

Smith (2002)

Hence:

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>4</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.

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<sup>4</sup> Karl W. Miller, a senior partner at Miller McConville & Company, a private firm that invests in distressed energy assets, quoted in Glater (2002).

## A.2 Williams

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 (Williams Companies, Inc. (2001a)). It had sold approximately 14% of the stock in an initial public offering (IPO) and in April 2001 distributed most of the remaining shares to complete the spin-off (Williams Companies, Inc. (2001c)). Energy trading was seen as the engine for the continued rapid growth of the firm. Williams stated that:

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.

Williams Companies, Inc. (2001b, p. 6)

In October 2001 Standard & Poor's raised Williams'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-ten traders in gas and electricity.

Standard & Poor's (2001, p. 1)

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 (*New York Times* (2002b)). Williams acted relatively swiftly, announcing, in December 2001, a plan to 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 (Williams Companies, Inc. (2001d)).

The second problem surfaced at the end of January 2002 when Williams was forced to delay announcing its fourth-quarter 2001 results (Gilpin (2002a)). In structuring the spin-off of the communications division, Williams had provided guarantees on certain debt (*New York Times* (2002a)). 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 (*New York Times* (2002b)). The size of this danger caused Standard & Poor's to place Williams on a negative credit watch on February 1, 2002 (Wolinsky and Waite (2002)). Eventually, in late February, the communications company acknowledged that it was considering filing for Chapter 11

bankruptcy, something that had been widely rumored and that weighed on Williams's stock and credit rating (Gilpin (2002b)). On February 27 Moody's placed Williams on watch (Moody's Investors Service (2002a)). In April the 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 (Williams Companies, Inc. (2002a) and Moody's Investors Service (2002b)).

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 (*New York Times* (2002c)). With its rating already on negative watch, the company found its trading business drying up as counterparties hesitated to do business with it.<sup>5</sup> On May 28 Standard & Poor's lowered Williams's rating to BBB (Wolinsky and Shipman (2002a)). On June 7 Moody's followed, lowering its rating to Baa3 (Moody's Investors Service (2002d)). On June 11 the company announced that it was revising its earnings forecast for the year downward:

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 ten or twenty 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 call. "The credit confidence is gone. There are few counterparties willing to enter into long-term agreements."

*New York Times* (2002d)

The company therefore announced it was scaling back its trading operations (*New York Times* (2002d)).

On July 23 and 24 Williams was hit with announcements from both Standard & Poor's and Moody's 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 (see Wolinsky and Shipman (2002b) and Moody's Investors Service (2002f)). Standard & Poor's then lowered it again, on July 25, to B+ (Wolinsky and Shipman (2002c)).

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<sup>5</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's credit and liquidity situation and limited this business' ability to manage market risk and exercise hedging strategies as market liquidity deteriorated" (Williams Companies, Inc. (2002b, p. 5)).

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's energy risk management and trading business also relied upon the investment-grade rating of Williams's 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 its credit downgrade to noninvestment grade during 2002, Williams is effectively required to post margins of 100 percent or more on forward positions which result in a loss.

Williams Companies, Inc. (2003, p. 82)

Furthermore, *Journal Record* (2002) reported that:

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.

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 (Williams Companies, Inc. (2002b,c)). By December the company had significantly pared down its trading operations, and by March 2003 it had made the decision to close them down entirely (Williams Companies, Inc. (2003)).

### **A.3 Aquila**

In 2000 Aquila was the very successful energy trading arm of UtiliCorp, an electricity company based in Kansas City, Missouri. Like Enron, energy trading at Aquila grew out of its long-standing business as a natural gas marketer (UtiliCorp United Inc. (2001, p. 3)). Aquila expanded energy trading to take advantage of the opening up of deregulated electricity and energy markets (Aquila Inc. (2001, p. 2)). 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 (UtiliCorp United Inc. (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 to back 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 (Business Wire (2001)).<sup>6</sup>

Despite this restructuring, UtiliCorp immediately ran 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 (Business Wire (2002a)). 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 (Shipman (2002)). On May 20 Moody's did the same (Moody's Investors Service (2002c)).

The day after Moody's action, UtiliCorp announced a paring down of its trading operations as one step toward improving its credit rating (Reuters (2002)). By June the company found itself forced to go further still and announce a major strategic repositioning involving a large-scale reduction in its trading operations (Business Wire (2002b)). 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 (Sharma (2002) and Moody's Investors Service (2002g)). By the time the company published its annual report for 2002 it was stating simply that it had left the trading business entirely, transforming itself exclusively into a regulated utility business and nonregulated power generation business (Aquila Inc. (2003)).

#### **A.4 El Paso**

The El Paso Corporation 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 (Barrionuevo and Benson (2002)). El Paso also found itself caught in the spotlight on off-balance-sheet structured transactions created by the revelations at Enron (Smith and Sapsford (2002)). 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

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<sup>6</sup>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 we continue using the name UtiliCorp for the parent or combined entity and Aquila for the trading operations only.

certain spin-offs of electricity supply contracts (Cummins and Barrionuevo (2002)). 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 (Barrionuevo (2002)). 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 (El Paso Corporation (2002)). 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 & Poor's put El Paso on a negative credit watch (Ferara and Whitlock (2002)). The next day Moody's took the same step (Moody's Investors Service (2002h)). On October 2 Moody's went further and actually announced a downgrade from Baa2 to Baa3, the lowest investment grade rating. Moody's also left El Paso on negative credit watch for further downgrades (Moody's Investors Service (2002i)). 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>7</sup> By the end of the month the company's credit ratings were lowered to below investment grade (see Moody's Investors Service (2002k) and Ferara (2002)).

### A.5 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 (Mirant Corporation (2001, p. 4)). 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 also contributed. Mirant found itself forced to reverse course and pull out of its India operations (*New York Times* (2001)). It faced allegations of price

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<sup>7</sup> The company's 2002 10-K form 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).

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 loads (*Wall Street Journal* (2001a)).

On December 19, 2001 Moody's lowered Mirant's credit rating to Ba1, which is below investment grade (Moody's Investors Service (2001)). 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 10-K form the US\$323 million shift in net collateral from US\$45 million positive in 2000 to US\$278 million negative in 2001 was primarily due to the credit rating downgrade (Mirant Corporation (2001, pp. 35, 33)).

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 (*Wall Street Journal* (2001b)). 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 (noninvestment grade status at Moody's, one level above noninvestment grade status at Standard & Poor's) effectively impair its ability to trade and market energy on a profitable basis.

Niles and Chin (2002, p. 3)

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 (see Das (2004, pp. 1181–1217) and citations therein, and Remolona *et al* (1996)). 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 (Dow Jones Energy Service (2002)).

Despite its efforts to pare back capital expenditures and trading operations and to otherwise restructure, Mirant was hit with a second set of downgrades in October 2002. On October 10, Moody's announced a further downgrade to B1 (Moody's Investors Service (2002j)). 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 of 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 range of US\$300 million – a very manageable amount compared to our current liquidity of US\$1.7 billion.

Mirant Corporation (2002b)

Then, on October 21, Standard & Poor's lowered Mirant's rating from above to below investment grade, setting the rating at BB (Standard & Poor's (2002)).

The stream of bad news continued. On December 20, 2002, Mirant reported a loss for the third quarter as a result of write-downs related to the cancelation 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 (Mirant Corporation (2002c,d)). 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 (Mirant Corporation (2003a)). On April 30 Mirant announced a loss of US\$2.4 billion for 2002 (Mirant Corporation (2003b)). The poor performance and an inability to restructure debt caused Mirant to file for bankruptcy on July 14, 2003 (Mirant Corporation (2003c)).

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