

## USEC INC.

When the loudspeaker in Concourse A of the Richmond International Airport announced that his 4:00 p.m. flight to Boston was delayed until 7:00 p.m., Ben Mackovjak realized that his hope of seeing any of the 7:00 p.m. Red Sox game at Fenway Park was gone. Mackovjak worked as an analyst for Rivanna Capital (Rivanna), a long/short equity hedge fund based in Charlottesville, Virginia that focused on publicly traded small and midcap companies. As a hedge fund company, Rivanna followed a simple investment rule to buy stocks (a long position) that were undervalued by 10% or more and short sell stocks (a short position) that were overvalued by 15% or more. Since its inception a few years earlier, Rivanna's investors had become accustomed to earning superior risk-adjusted returns. The key to Rivanna's success up to now had been to conduct careful analyses of the fundamental value drivers of companies to identify the right stocks for a portfolio.

Mackovjak had been offered the analyst position for the summer of 2006, after completing his first year of the MBA program at the University of Virginia's Darden School. If the Rivanna partners were pleased with his work, Mackovjak could receive a permanent offer that would be effective immediately after his graduation the following May. It was now July, and Mackovjak had participated in the analysis of many interesting companies; however, none had been as interesting as USEC Inc., and none was more important to his aspiration of securing a permanent job offer from Rivanna. USEC was the first company for which Mackovjak had the responsibility of recommending the stock as either short or long to the senior partners. With only one more month before classes started, it was unlikely that he would have another such opportunity to display his capabilities.

Mackovjak had been pouring over USEC's financials, listening to past conference calls with equity analysts, and reading various research reports. The results of his discounted cash-flow analysis showed him that USEC's stock price of \$10.80 fairly reflected the expectations of the cash-flow potential of USEC's existing operations as well as the future growth of those operations. But Mackovjak also recognized that USEC was in the beginning stage of a massive capital-expenditure project known as the American Centrifuge Project (ACP) that would almost double the scale of the company and dramatically improve its competitive position. Given the

size and importance of the ACP, it seemed almost certain that including the project in his analysis would ultimately be the key to Mackovjak's recommendation about the stock. If he found ACP to be a value-creating investment, it would imply that the USEC stock was undervalued, and Rivanna should take a long position. Conversely, if ACP was a value-destroying investment, Rivanna should short the stock to take advantage of it being overvalued by the market. More importantly, if Mackovjak improperly assessed the value of ACP, then his recommendation about USEC would almost certainly prove to be wrong, which would not play well for his career aspirations at Rivanna.

Now that he had several hours to kill waiting for his flight, Mackovjak decided to pick up where he had left off at the office a few hours ago, evaluating USEC. It was true that he had been working long hours all summer and deserved a weekend in New England with friends, but it was also true that the founding partner of the firm wanted his recommendation on USEC by Monday morning.

## **USEC Background**

Headquartered in Bethesda, Maryland, USEC was the world's leading supplier of enriched uranium fuel for commercial nuclear power plants. In addition to the enrichment business, USEC also performed related contract and consulting services for the Department of Energy (DOE) (**Exhibits 1 and 2**). USEC was a publicly traded company that leased its technology and facilities from the DOE. USEC's unique business model carried with it significant influence from the U.S. government through its contractual obligations with the DOE and through other government agencies who had security concerns with uranium enrichment. The company competed in a global market with only three major competitors: AREVA/Eurodif (France), Tenex (Russia), and Urenco (Germany) and held a 50% share of the North American market and 30% share of the global market.

In the early 1990s, USEC was created as a government corporation to restructure the government's uranium-enrichment operation. In 1998, USEC was privatized, and by 2006, it operated the only uranium-enrichment facility in the United States, a gaseous-diffusion plant in Paducah, Kentucky. USEC also had another plant in Portsmouth, Ohio, which it had placed in cold standby<sup>1</sup> under a contract with the DOE. Urenco was planning to expand its operations by building a competing uranium-enrichment facility in New Mexico but had not yet begun construction of the facility, nor had it announced a precise time frame for the undertaking.

USEC served as the U.S. government's exclusive agent for the Megatons to Megawatts program, a 20-year nuclear-nonproliferation agreement between the United States and Russia. Through this program, USEC facilitated the conversion of weapons-grade uranium by buying the

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<sup>1</sup> Cold standby was a condition where the plant could be returned to production of three million SWU within 18 to 24 months if the U.S. government determined that additional domestic enrichment capacity was necessary. Under this agreement, the government paid USEC to maintain the plant in that state of readiness. Mackovjak's analysis suggested that the Portsmouth plant had unfavorable operating economics such that it would only be taken off standby for a national-defense-related issue.

uranium from the Russian government and then selling it as fuel to commercial power-generating companies. The uranium purchase provided the Russian government with a steady stream of revenue and, at the same time, supported the intention of the United States to keep uranium out of the wrong hands. With seven years still left in the program, USEC estimated that the agreement had been responsible for the dismantling of 20,000 Russian warheads.

The Megatons to Megawatts agreement stipulated that USEC would buy the equivalent of 5 million pounds of uranium each year at a fixed price of \$20 per pound.<sup>2</sup> For many years, USEC had benefited from the fixed-price agreement as the market price of uranium had risen well above \$20 per pound; however, the requirement of purchasing 5 million pounds regardless of the demand from USEC's customers had resulted in a large buildup of uranium inventory. On occasion, USEC would sell excess uranium from its inventory but as of Q2 2006, it carried 29 million pounds of uranium in inventory, which was reported at a cost of \$20 per pound.<sup>3</sup>

Based on a classic investments book by Benjamin Graham, Mackovjak had computed the net working capital of USEC on a book-value and a market-value basis (**Exhibit 3**). According to Graham, companies that sold for less than their working capital "after deducting all liabilities ahead of the stock" were truly "bargain issues."<sup>4</sup> Following Graham's hypothesis, Mackovjak computed what he termed a "net working-capital liquidation value" and found it to be higher than USEC's stock price of \$10.80 per share. Although he found this an interesting exercise, he decided it was not relevant for his analysis, which relied upon future cash flows at both the firm and the ACP level.

### **Uranium-Enrichment Process**

Uranium fuel was sold as Separative Work Units (SWU), which was a measure of the energy required to convert natural uranium into a blend of enriched uranium. In order to produce SWUs for sale, USEC needed to purchase the uranium and then perform the enrichment process as needed. Uranium, when found in nature, had two principal isotopes: uranium-235 and uranium-238, but only U<sup>235</sup> was fissionable. With U<sup>235</sup> constituting only approximately 1% of raw uranium, uranium typically had to be enriched to bring the concentration of U<sup>235</sup> up to a level approaching 5% to qualify for use by a nuclear power plant.

USEC's existing enrichment process at the Paducah plant used gas-diffusion technology, which required large amounts of electricity to operate a series of enormous industrial compressors. For many years, USEC had managed to keep the cost of electricity stable until its long-term contract with a power supplier expired. Without the benefit of the power contract, USEC's margins had shrunk as its cost of production relative to its competitors had suffered. In 2005, USEC's enrichment cost for the gas-diffusion process was \$42 per SWU and was expected

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<sup>2</sup> The MTM program allowed USEC to buy either raw uranium or the equivalent of 5 million pounds of uranium. Either way, USEC paid the equivalent of \$20/lb. of raw uranium and recorded it as \$20/lb. in its inventory account.

<sup>3</sup> Because uranium was considered a durable material, it was not depreciated for accounting purposes.

<sup>4</sup> Benjamin Graham, *The Intelligent Investor* (New York: Harper & Row, 1986), 14.

to increase in line with inflation. The capacity of the Paducah plant was 3.5 million SWU per year. When USEC phased in the ACP, production would be moved to the ACP, causing Paducah’s production to fall to 1 million SWU in 2011 and zero in 2012, and the plant would be placed in cold standby.<sup>5</sup> USEC paid \$8 million annually to the DOE to lease the Paducah plant, an expense that would disappear once the plant was in cold standby. If USEC continued to run Paducah at its capacity of 3.5 million SWU, the company expected to spend \$30 million on capital expenditures every year, and depreciation on the plant would approximate capital expenditures for the near future.

**Uranium and the SWU Market**

Global energy prices had increased dramatically during the past several years as had the prices for uranium and SWU (**Exhibit 4**). USEC management estimated that the price of uranium in 2006 would be \$43 per pound,<sup>6</sup> while the price of one SWU would be \$127. Like most commodities, there was substantial volatility of uranium and SWU prices as supply and demand pressures changed over time. On average, the best guess regarding future prices was that uranium and SWU would increase with inflation. These market prices were important to USEC because its customers paid the prevailing price for SWU, which in turn determined USEC’s revenues.

**The American Centrifuge Project**

The ACP was an attempt by USEC to leapfrog over the technology of its competitors. USEC expected the cost efficiencies of the new technology to position it as a low-cost producer in the enrichment industry; however, the cost advantage would come at a high cost as the massive scale of the undertaking was expected to cost \$1.7 billion during the next five years. To date, USEC had spent only \$100 million on the ACP. If USEC could contain the cost of the project, the remaining balance of \$1.6 billion could be spent during the next five years as shown in **Table 1**.

Table 1. Projected five-year USEC spending (\$ millions).

<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
\$185	\$300	\$350	\$350	\$415

<sup>5</sup> When the centrifuge plant was in full operation and the Paducah plant was in cold standby, the Portsmouth plant would be shut down.

<sup>6</sup> Raw uranium was quoted and traded per pound, whereas an SWU depended upon the degree of enrichment of the uranium, as well as the amount of raw uranium in the process. On average, however, it was estimated that USEC used approximately one pound of uranium to produce one SWU.

If construction remained on schedule, the facility would be ready in late 2010, and the plant fully operational by early 2011, at which time the Paducah plant would begin to be scaled down. The ACP would be depreciated starting in 2011, using the straight-line method during its expected useful life of 15 years, at which time the plant would have zero salvage value. USEC expected the plant to produce 2.5 million SWU in 2011, increase production by 2 million SWU during the next two years, and reach its maximum capacity at 6.5 million SWU in 2013. Management was confident that enrichment demand would ensure that USEC would be able to produce at full capacity. Selling, general, and administrative expenses were expected to rise according to the increased revenues produced by the ACP. USEC estimated that the electricity required for enrichment would be reduced by 95%, so that the overall enrichment costs would be cut by 50%, relative to the existing gas-diffusion process. For the longer term, management expected the enrichment costs for the ACP would increase with inflation. The company expected to pay a royalty of 1% of gross revenue to the DOE as compensation for its initial research and development of the centrifuge technology. After completion, the ACP would require a minimal level of maintenance investment.

## **The Decision**

Mackovjak had most of the information he needed to value the ACP, although he still thought he needed a few important assumptions to complete the analysis. In particular, he wanted to determine a market-risk premium, a long-term inflation rate, and the net working-capital requirements of the ACP. During his first year in the Darden MBA program, Mackovjak had made these types of assumptions repeatedly, so he was confident that a market-risk premium in the range of 5% to 6% was a reasonable estimate. Picking an inflation rate and estimating working capital, however, were not as familiar to him.

Estimating the long-term inflation rate was troublesome because inflation rates were often volatile and using an incorrect inflation forecast could lead to a significant valuation error. Mackovjak knew that he needed to consult someone knowledgeable about inflation and decided to contact his Darden professor, Dr. Peter Rodriguez. Rodriguez had studied at Princeton under Dr. Ben Bernanke, currently serving as the chairman of the Federal Reserve. Mackovjak thought that Rodriguez would know what Bernanke considered a reasonable inflation rate, and he was certain that the dedicated professor would still be in his office on a Friday evening. Sure enough, Mackovjak reached Rodriguez and, after a 45-minute conversation, learned that a reasonable long-term inflation assumption was 3%, which was consistent with current Treasury yields.

To determine the net working-capital requirements of the ACP, Mackovjak needed another highly qualified person, so he turned to Darden alum Craig Weise, who was a senior analyst at Rivanna Capital and had assisted on parts of the USEC research. Weise judged that the ACP would require net working capital equal to 5% of sales. This surprised Mackovjak who had initially thought that a number twice as large was appropriate; however, now he understood why Weise had been named a Shermets Scholar, an award given only to the best Darden MBA students. Because Shermets were well known for their net working-capital estimates and because he wanted to stay in Weise's good graces, Mackovjak decided to defer to him and use 5% of

sales for his working-capital assumption. For information on capital-market conditions, see **Exhibit 5**.

It was now midnight and Concourse A was almost completely deserted. The Red Sox had won in the 10th inning. His flight had been rescheduled for the following morning. The last place to buy food had closed, rendering Mackovjak's \$5 food voucher essentially worthless. As he left the airport for his comped hotel room, feeling tired and defeated, Mackovjak wondered if there was more to the USEC story than just a discounted cash-flow valuation of the ACP.

## Exhibit 1

**USEC INC.**Income Statement as of December 31  
(in millions of dollars)

	<u>2005</u>	<u>2004</u>	<u>2003</u>	<u>2002</u>
Total revenue	\$1,559.3	\$1,417.2	\$1,436.7	\$1,380.2
Cost of goods sold*	1,430.6	1,279.9	1,319.1	1,305.6
Selling, general and administrative	<u>61.9</u>	<u>64.1</u>	<u>69.4</u>	<u>54.1</u>
Operating profit	66.8	73.2	48.2	20.5
Interest expense	(40.0)	(40.5)	(38.4)	(36.5)
Other, net	<u>10.5</u>	<u>3.9</u>	<u>5.4</u>	<u>7.0</u>
Net income before taxes	37.3	36.6	15.2	(9.0)
Provision for income taxes	<u>15.0</u>	<u>13.1</u>	<u>6.2</u>	(5.0)
Net income after taxes	22.3	23.5	9.0	(4.0)
Net income per share**	\$0.26	\$0.28	\$0.11	(\$0.05)
Dividends per share	\$0.55	\$0.55	\$0.55	\$0.55
* Includes depreciation expense as:	\$35.0	\$31.8	\$29.3	\$23.9
** Using weighted average shares outstanding as:	86.1	84.1	82.2	81.4

## Exhibit 2

**USEC INC.**Balance Sheet as of December 31  
(in millions of dollars)

	<u>2005</u>	<u>2004</u>	<u>2003</u>	<u>2002</u>
Cash and short-term investments	276.9	174.8	249.1	171.1
Accounts receivable—trade, net	256.7	238.5	254.5	225.4
Inventories	961.6	992.2	860.9	839.6
Deferred income tax and other	<u>120.5</u>	<u>83.4</u>	<u>100.3</u>	<u>51.6</u>
Total current assets	1,615.7	1,488.9	1,464.8	1,287.7
Net property/plant/equipment	171.2	178.0	185.1	190.9
Goodwill, net	11.1	4.3	--	--
Other long-term assets	<u>282.8</u>	<u>332.2</u>	<u>484.9</u>	<u>570.9</u>
Total assets	2,080.8	2,003.4	2,134.8	2,049.5
Accounts payable	217.4	202.3	189.4	218.5
Customer advances	99.0	73.3	68.3	45.0
Other payables	<u>111.6</u>	<u>89.7</u>	<u>197.5</u>	<u>106.6</u>
Total current liabilities	428.0	365.3	455.2	370.1
Long-term debt	475.0	475.0	500.0	500.0
Pension benefits—underfunded	153.9	145.2	138.1	137.8
Deferred income tax and other	<u>116.3</u>	<u>99.2</u>	<u>117.9</u>	<u>127.2</u>
Total liabilities	1,173.2	1,084.7	1,211.2	1,135.1
Common stock, total	10.0	10.0	10.0	10.0
Additional paid-in-capital	970.6	963.9	1,009.0	1,054.8
Treasury stock	(99.5)	(109.2)	(127.7)	(133.5)
Retained earnings (accumulated deficit)	<u>26.5</u>	<u>54.0</u>	<u>32.3</u>	<u>(16.9)</u>
Total equity	907.6	918.7	923.6	914.4
Total liabilities and shareholders' equity	2,080.8	2,003.4	2,134.8	2,049.5

## Exhibit 3

**USEC INC.**

Net Working-Capital Liquidation Value  
(in millions of dollars)

	<u>Book</u>	<u>Market</u>
Cash and short-term investments	276.9	276.9
Accounts receivable—trade, net	256.7	256.7
Megatons to megawatts inventory *	580.0	1,247.0
Other inventory (SWU, uranium, etc.)	<u>381.6</u>	<u>381.6</u>
Total current assets	\$1,495.2	\$2,162.2
Accounts payable	217.4	217.4
Customer advances	99.0	99.0
Other payables	<u>111.6</u>	<u>111.6</u>
Total current liabilities	\$428.0	\$428.0
Net working capital	\$1,067.2	\$1,734.2
Less debt	( <u>\$475.0</u> )	( <u>\$437.8</u> )
Less pension underfunding	( <u>\$153.9</u> )	( <u>\$153.9</u> )
Liquidation value	\$438.3	\$1,142.5
Liquidation value/share	\$5.1	\$13.1
Premium over current stock price (\$10.8)	-53%	22%

\*Book value of uranium computed as 29 million equivalent pounds × \$20/lb. = \$580 million.  
Market value of uranium computed as 29 million equivalent pounds × \$43/lb. = \$1,247 million.

Exhibit 4  
**USEC INC.**

Uranium and SWU Market Prices

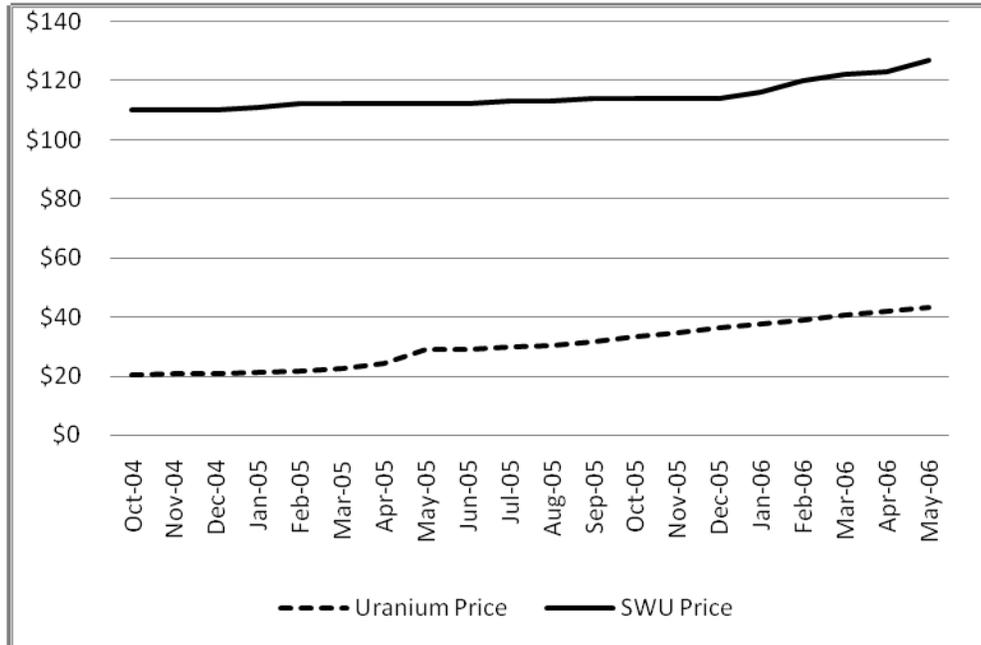


Exhibit 5

**USEC INC.**

Capital-Market Conditions (July 21, 2006)

**U.S. Treasury Bonds Rates**

<u>Maturity</u>	<u>Yield</u>	<u>Last Week</u>	<u>Last Month</u>
6-month	5.02	5.03	5.20
3-year	5.02	5.05	5.17
5-year	4.98	5.02	5.13
10-year	5.04	5.06	5.15
30-year	5.09	5.11	5.19

**USEC Public Debt**

<u>Issue</u>	<u>Amount (\$ millions)</u>	<u>S&amp;P Rating</u>	<u>YTM</u>
7.75 % due 2015	475	B-	9.04%

**USEC Beta**

Five years of monthly data	1.30
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**Stock Price Performance**

Recent share price	\$10.80
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**USEC Inc. Stock Price**

