

CFA-DFW/CFA HOUSTON *Student Research*

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Carbo Ceramics Inc.

February 11, 2009
Sector: Energy
Industry: Oilfield Services

Ticker: CRR
Current Price: \$38.75

Recommendation: BUY
One Year Price Target: \$53.67



Earnings/Share

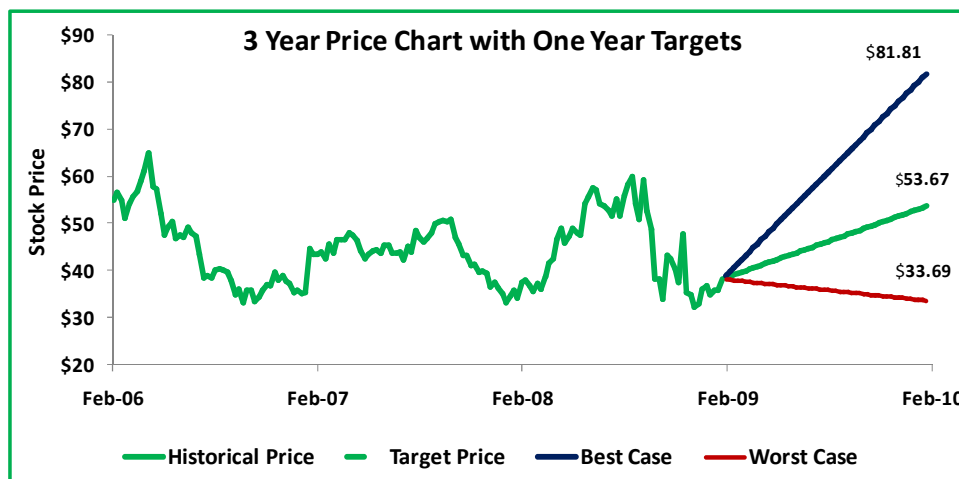
	Q1	Q2	Q3	Q4	Year	P/E
2007	\$0.55	\$0.53	\$0.58	\$0.56	\$2.21	19.9x
2008	0.58	0.55	0.75	2.66	4.51	20.0
2009E	0.37	0.39	0.65	0.75	2.15	18.0
2010E	0.76	0.76	0.76	0.76	3.03	12.8

Highlights

- **Strong Fundamentals in Challenging Economic Environment:** The company is still aggressively expanding capacity but has no debt, strong free cash flow, and continues to payout dividends and buy back stock. Relative to its peers, the company is in an excellent position to survive the economic downturn and resume sustained moderate growth.
- **Strong Competitive Position as Ceramic Proppant Leader:** The overall proppant market is growing and ceramic proppant continues to steal market share from sand based competitors, with large impending projects likely to require ceramics. Carbo, as the only U.S.-based ceramics provider, is well-positioned to reap the rewards of these upcoming market trends.
- **Valuation Hitting All-Time Historic Lows:** P/E, EV/EBITDA, and Price-to-Sales levels are all hitting historic lows, both for Carbo Ceramics and the industry, primarily due to the price decline in natural gas and general economic malaise. We believe Carbo's excellent liquidity and solvency make these levels unfair, and multiple expansion is likely when the market fully realizes Carbo's strong fundamental and competitive advantages.

Key Statistics

52 Week Price Average	\$30.38-60.57
Average Daily Volume	598,000
Beta	1.33
Dividend Yield	1.70%
Shares Outstanding	24.46 mm
Market Capitalization	936.53 mm
Institutional Holdings	93%
Book Value Per Share	\$18.36
Debt to Total Capital	0
Return on Equity	14.52%



Investment Summary

We are initiating Carbo Ceramics, Inc. (CRR) with a “Buy” rating due to several strengths and catalysts, both quantitative and qualitative, which outweigh the investment risks of the stock. The one year price target of \$53.67 is based on a blended average of 50% multiple analysis and 50% discounted cash flow (DCF) intrinsic valuation and represents a 38.5% premium over the closing price on February 9. Additionally, Monte Carlo and sensitivity analysis to key inputs and revenue drivers indicates that in a “worst case” scenario, the company is overvalued by 33%. Given that the upside in the base case is higher than the worst case scenario, we find the risk/reward analysis compelling.

Overall proppant market is growing

The overall proppant market continues to grow in the face of economic turmoil and plunging oil and natural gas prices. While a long-term, sustained decline in oil and natural gas prices would halt drilling projects and put pressure on the company’s profitability, Carbo has the liquidity and solvency strength to wade through what would be a disaster scenario for the industry.

Sand-based competitors will continue to lose market share to ceramics

The ceramic market continues to steal market share from the cheaper sand proppant market. This growing use of ceramics is a function of three key things: the types of wells being drilled (which require the higher priced ceramic proppants), more drilling needed per well, and the technical marketing and consulting by CRR that demonstrates the advantages ceramics has over the alternatives. While some customers may return to cheaper sand alternatives due to budget tightening, we believe the current crop of projects (such as the Haynesville Shale) that require higher priced ceramic proppants to maximize output reduce the likelihood of mass downgrading by Carbo Ceramic’s key customers.

Domestic Strength of CRR outweighs international challenges

The domestic competitive positioning of the company outweighs, in our view, the risk of future challenges in a more competitive international landscape. Carbo Ceramics is one of two companies with plants in the United States, and the only company to specialize in ceramic proppant production. The company owns several patents and has spent hundreds of millions on capital expenditures to increase production capacity, making competitor entry into the United States difficult. High shipping costs of the proppants also makes import competition less of a concern than in other industries. For similar reasons, we also see challenges in CRR’s international growth ambitions. Competitors in emerging markets (such as China, Russia, and Brazil) are appearing more frequently, and a recent decline in overseas volume, along with plant reductions in China, portend future challenges.

DCF and Multiples Analysis indicate company is undervalued

A conservative estimate of Carbo Ceramic’s intrinsic value (using discounted cash flow analysis) indicates the stock’s value is \$58.72, a 52% upside from the stock’s current price. We feel the company’s relatively predictable and consistent revenue drivers make the DCF analysis particularly useful.

According to analysis of several multiples (price/sales, price/book, price/earnings, and EV/EBITDA), the company is also trading at historically low levels, while industry multiples have also contracted substantially. While the company’s multiples have not contracted as much as the industry, we believe the company’s strong financial profile is not being adequately recognized given the current market environment, and that the company can return to its average multiple over the past year.

Sensitivity and Monte Carlo analysis indicates reward is much greater than risk

In a worst case scenario, CRR will continue to lose market share overseas, will lose business to cheaper sand-based competitors and Saint-Gobain, and the macro outlook for oil and natural gas will further deteriorate. Under this scenario, volume growth for proppant will slow, the price per pound of ceramics will decline, and Carbo’s market share will evaporate. Even under this worst case scenario, our sensitivity analysis indicates the company only has 33% downside from its current price. In a best case scenario, where oil and gas prices recover to their three year averages (driving up demand for proppants), ceramic proppants continue to steal market share from sand, and the company is able to gain more traction overseas, the company has more than 100% upside.

Business Description

Carbo Ceramics, an oil equipment and services company, is the world's largest producer and supplier of ceramic proppants. The company's products and services are mainly used in the hydraulic fracturing of natural gas and oil wells to help well operators and oilfield service companies maximize oil and natural gas flow rates. CRR manufactures five ceramic proppant brands, each targeting various well depths (Please refer to Appendix 1 for product details). CRR's customers are some of the largest participants in the worldwide petroleum pressure pumping industry, while the end users of CRR's products are natural gas and oil well operators that hire pressure pumping service companies to hydraulically fracture their wells.

Proppants essential in hydraulic fracturing process

Hydraulic fracturing is the most widely used method for increasing production from oil and natural gas wells. Fluid is pumped into a well to apply enough pressure to create a fracture, or crack, in the rock formation. The fluid contains proppant, a granular, pellet shaped material, which fills the fracture and "props" it open once the pumping ceases. This fracture then enables the oil and natural gas hydrocarbons to flow more freely from the rock formation to the surface. CRR currently generates more than 90% of its total revenue by selling various forms of ceramic proppants to oil and gas companies.

Ceramic proppants improve E&P operators' production and recovery rates

Three main types of proppants are used in hydraulic fracturing: sand, resin-coated sand, and ceramic, with sand being the least expensive and ceramic the most expensive. Made from alumina-bearing ores, ceramic proppants are the most expensive as they deliver the greatest increase in well flow rates and thereby increase the cash flow to well operators. This increase is primarily due to ceramic proppant's higher strength and more uniform size and shape.

Industry Overview – Oilfield Services

The Oilfield Equipment and Services industry is a very large and fragmented industry. According to the American Petroleum Institute, more than 10,000 companies operate in this industry in the U.S. alone. Most companies fall under four broad categories:

- Offshore drilling
- Onshore drilling
- Diversified oilfield services
- Offshore supply, construction, and equipment manufacturing

The vast majority of oilfield equipment and services industry revenue is driven by upstream capital spending by oil and natural gas operators. Therefore, industry revenues are tied to the capital budgeting programs of these large operating companies. When commodity prices are high, more expensive exploration projects can be undertaken such as deepwater drilling, oil sands, and shale (tight gas). These exploration and discovery activities lead to an increase in drilling activity and subsequently an increase in demand for the oilfield equipment and services industry. All of this activity is focused on increasing overall hydrocarbon production.

Porter's Five Forces – Proppant Industry

A specific sub-industry of the oilfield equipment industry is proppant manufacturing and distribution. There are relatively few providers of proppants worldwide; however, the number of competitors has been increasing. An analysis based on Porter's Five Forces Model facilitates identification of the competitive intensity and overall attractiveness of the proppant segment.

Bargaining Power of Buyers – High

As hydraulic fracturing customers have the option to select from several variants of proppant type (sand, resin-coated sand, and ceramic) and engage in large volume purchasing, proppant buyers have significant leverage in industry. In addition, there are a limited number of firms that specialize in hydraulic fracturing of natural gas wells.

Bargaining Power of Suppliers – Low

Many of the key inputs into the manufacturing process of proppants are alumina-bearing ores (bauxite, kaolin, etc.). The price of these alumina-based commodities is one of the main determinants of the total price that raw material suppliers can charge. Proppant manufacturers reduce their commodity risk/exposure by locking into longer term contracts with a raw materials supplier, or owning the raw materials production operation outright. Suppliers have relatively low bargaining power due to the necessity of locking in forward contract prices, as well as having only a few large volume customers.

Threat of Substitute Products – Low

Currently sand and ceramic proppants are the main products used for increasing flow rates for wells that are hydraulically fractured. Even though there are several proppant types to select from, the main threat of a substitute would come through a technological

breakthrough that would render the hydraulic fracturing process obsolete or uneconomical. However, as these technologies take time to develop and commercialize, the immediate threat of a technology-displacing process for hydraulic fracturing is low.

Threat of New Entrants – Low

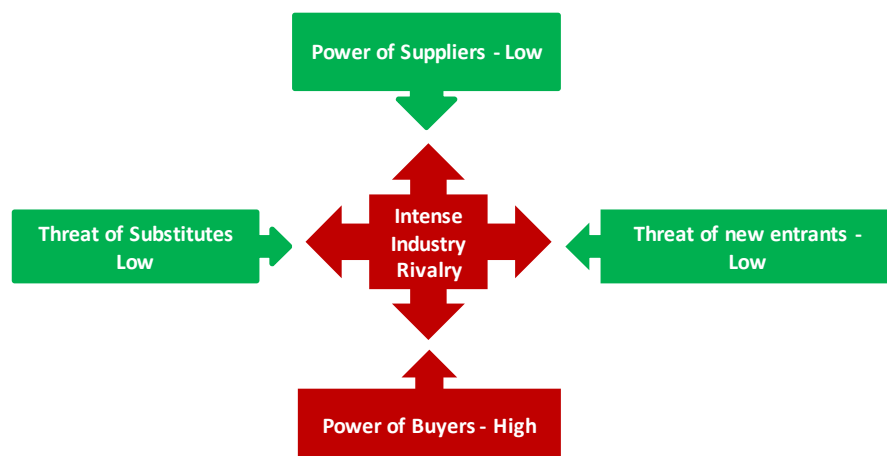
This industry presents high barriers to entry for any new firm looking to gain a foothold due to the large amount of capital outlay required to establish manufacturing and distribution capabilities in order to compete on a global scale. The biggest threat to the industry remains a firm entering based on a new breakthrough technology that would replace hydraulic fracturing.

Industry Rivalry is Intense

The global proppant industry is extremely competitive. Most firms compete on price for lower end proppants (sand) and technical marketing for premium products (ceramic). The proppant industry relies heavily on technology, with firms continually developing improved proppant product capabilities. Overall, industry attractiveness is low to new entrants and high for incumbents.

Figure 1 below summarizes how the forces interact with each other.

Figure 1- Porter's Five Forces Model



Industry Position and Competitive Landscape

CRR competes globally with sand and ceramic proppant manufacturers

Carbo is the only substantial U.S. producer of ceramic based proppants. CRR competes directly with ceramic proppant producers and indirectly with sand and resin-coated sand proppant producers. (For a summary of CRR's known competitors, please refer to Appendix 2). CRR's successful introduction of its product CARBOHDYROPROP has helped the firm continue to displace sand-based competition, and the company plans to continue developing new products that can be more cost competitive with sand products. (For additional detail on CRR's brands, see Appendix 1).

CRR dominates domestic ceramics market

Domestically, CRR commands the largest percentage of market share for a variety of factors including lack of competition, capital infrastructure, technical marketing advantage, and close relationships with key customers. For example, CRR's fourth quarter 2008 domestic proppant sales volume increased 30 percent over the same period in 2007, despite only a small increase in the overall rig count in the U.S. and Canada. (Refer to Appendix 3 for a breakdown of ceramic industry market share).

CRR's domestic growth tied to fracture-intensive shale plays

CRR's products work well in shale structures due to the high stress and high temperature operating environments, so management reports a continued focus on efforts to expand the use of ceramic proppant in fracture-intensive shale plays in North America like the Haynesville, Deep Barnett and Marcellus shales. The Haynesville shale structure demands depths of up to 325 feet and 10,000 PSI. As CRR's proppants are sintered at 2700 degrees Fahrenheit, the degradation and conductivity loss is minimal, allowing an estimated 25% to 50% increase in production.

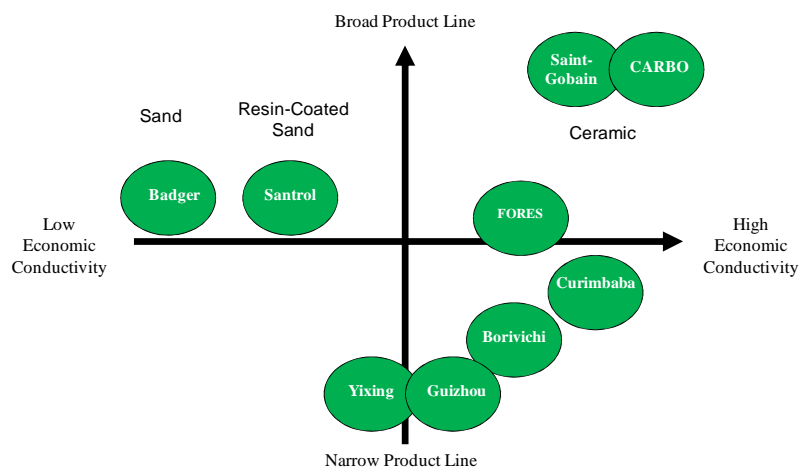
Recent declines in international revenues portend future challenges

According to a third party survey, CRR continues to dominate the international landscape, accounting for 35% of the global ceramic market, nearly twice that of its largest competitors, FORES and Saint Gobain (please see Appendix 3 for more details).

However, the number of competitors based overseas has increased in the last few years and Carbo has continued to see a decline in its international sales (down 25% in 2008 year to year alone). This is primarily due to the availability of locally produced proppants in countries like Russia and China, despite CRR's presence in both locations.

The perceptual map below (Figure 2) highlights CRR's major competitors in the proppant industry. As indicated, CRR currently provides the broadest product line and the best economic conductivity.

Figure 2- Perceptual Map Indicating Perceived Positions of Proppant Manufacturers



CRR's competitive strengths

Carbo's main differentiators are its wide range of high quality ceramic proppants, its capital infrastructure, its technical marketing expertise, and its on-time delivery performance.

Technical marketing capability increases conversions

Carbo continues to focus marketing efforts on educating potential consumers and end users on the technical and economic advantages of using ceramic proppant. Management believes that these efforts, and its new product introductions, will enable the company to increase its share of the sand-based proppant market. If Carbo expands its technical marketing efforts, it should continue to ride this upward trend.

CRR's production capacity expanding 27% by 2010

CRR has expanded its manufacturing capacity on a consistent basis since 1999 to increase its overall market share and will continue to pursue an incremental growth strategy. CRR's manufacturing operations are located in three regions: Southeast United States, China and Russia (see Appendix 4 for additional details on production capacity). There are 6 manufacturing facilities that produced over 1,355 million pounds of proppant in 2007.

Just in time delivery key to CRR's distribution success

CRR stores finished proppant at each of its manufacturing facilities as well as 13 remote stocking facilities located globally. These stocking facilities are located near areas of active natural gas drilling/production. This strategy enhances CRR's ability to deliver its proppant in a timely manner to their end customers. The company practices just-in-time delivery of its proppant with the goal of providing the entire amount of proppant requested to the customer one day after the order. CRR's current distribution network and successful just-in-time delivery of its products provide a key advantage over its competitors.

Investment Risks

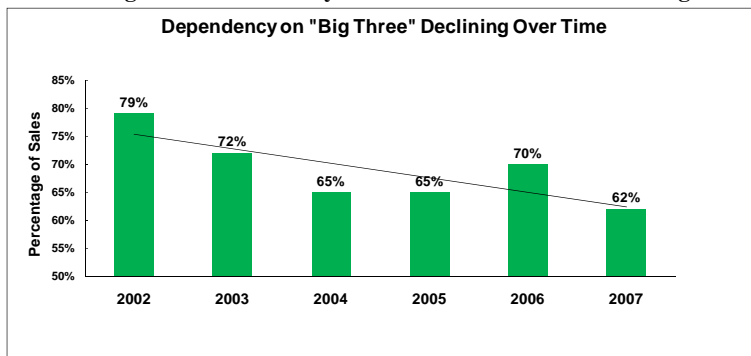
Carbo's six main investment risks include a drop in drilling activity level, commodity price fluctuations, development of alternative fracing techniques, an undiversified customer base, loss of patent protection, and general international business risk. The three main investment risks are outlined below; for a full list, see Appendix 5.

Concentrated customer base poses risk to future growth

CRR's largest customers, BJ Services Company, Halliburton Energy Services, Inc. and Schlumberger Limited, are three of the largest participants in the worldwide petroleum pressure pumping industry. Because these three companies accounted for 62% and 70% of CRR's 2007 and 2006 revenues, respectively, we believe a decline in sales to or a loss of any one of these customers could

seriously impair CRR’s financial condition. A correlation analysis was run to see how closely CRR’s stock performance tracked that of its main customers. In all three cases, the correlation was significant (range .58 to .62). Refer to Appendix 6 for correlation analysis details. Despite this dependence, Carbo is making a concerted effort to be less dependent on its top three clients than in previous years, which Figure 3 below indicates.

Figure 3- Percentage of Carbo’s Yearly Sales Derived from its Three Largest Customers



Patent protection and international business risk

CRR’s patents, which cover the manufacture and use of its products, are vital to its ability to gain and hold market share and return appropriate financial returns to its shareholders. The company, therefore, faces the possibility of losing a portion of its revenue or its competitive advantage if any or all of its patents are ignored, challenged, or violated. This issue poses the greatest risk in certain international markets in which the company operates like Russia and China, as these countries typically do not practice strict enforcement of intellectual property (IP) laws relative to Western nations. Because the proppant market is very competitive, the expiration or lack of enforcement of one of CRR’s key patents could adversely affect its operating performance. In addition, with CRR possessing production facilities in developing nations like China and Russia, the company’s operations and overall production capacity could be directly damaged by international operating factors like economic and political instability, changes in regulatory requirements, trade barriers, and currency rate fluctuations.

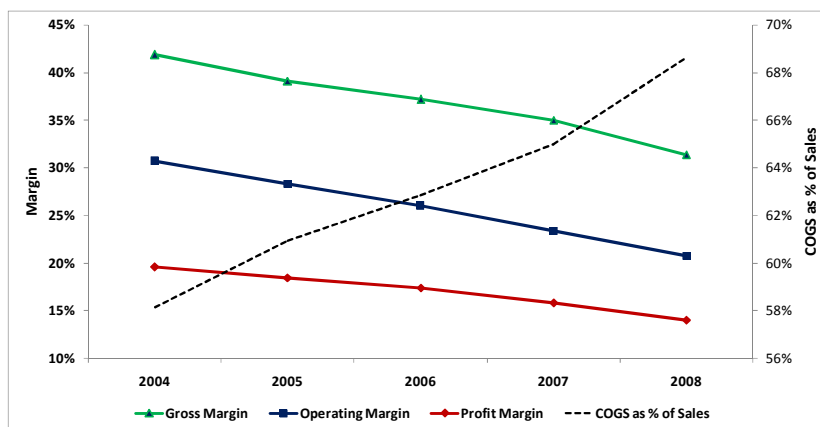
Profitability and Liquidity Analysis

The analysis below highlights what we believe are the most important elements of Carbo Ceramics’ financial analysis. Appendix 7 provides a more detailed view of company’s key ratios against comparable companies.

Declining margins primarily a product of rising input costs

Figure 4 below shows a consistent decline in margins between 2004 and the first three quarters of 2008, while cost of goods sold as a percentage of sales has risen each of the past five years. While there are several elements contributing to the rise in COGS, an overriding element has been the explosive rise in input costs (kaolin and bauxite), which roughly track the price of aluminum. Over the past year, the price of aluminum has declined over 60%. We believe the recent discontinuation of business with a primary input supplier in Australia (in 2007) will allow the company to lock in long-term contract prices substantially below levels seen in the last few years, resulting in higher margins.

Figure 4- COGS Drives Margin Decline

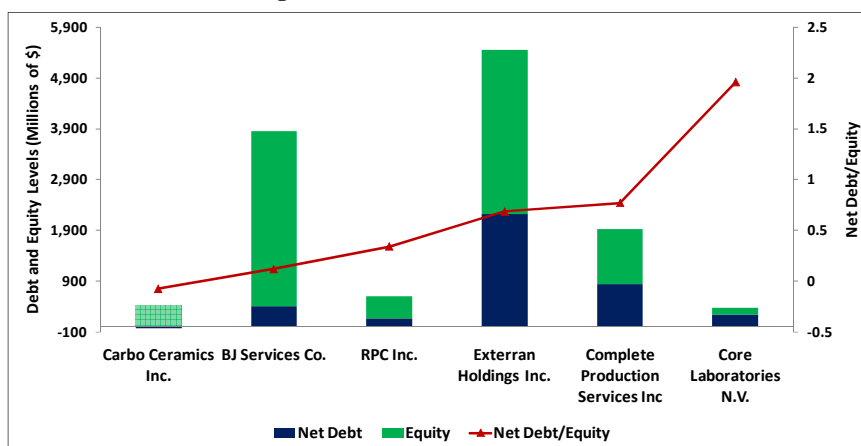


Source: Company financial statements and disclosures

Lack of Debt Gives Company a Favorable Liquidity Profile

Carbo Ceramics has no short or long term debt. In a market environment where bankruptcy is a very real risk for companies with large amounts of debt, we feel CRR is well-positioned to survive in the current market. Figure 5 below shows net debt levels in relation to equity, along with the debt-to-equity values of each company. Appendix 8 further emphasizes this point by breaking down the Dupont analysis framework.

Figure 5- Debt Levels Are Favorable



Source: Company financial statements and disclosures

Valuation

Our intrinsic value for Carbo Ceramics is **\$53.67**. This value is derived from a weighted average using discounted cash flow (detailed numbers appear on Appendices 9-18) and comparable multiples (Appendix 19) valuation.

Discounted Cash Flow (DCF) Analysis

Table 1 summarizes the key assumptions used in our DCF analysis:

DCF Assumptions	Historical 2005 - 2007			Assumptions 2009 - 2013	
	Average	St. Dev.	2008*	2009	2010 - 2013
Revenue Drivers					
Sales Volume Growth	7.7%	4.5%	28.5%	6.0%	17.0 - 6.0%
Average Price Per Pound Growth	5.2%	4.5%	0.0%	0.0%	9.0 - 3.0%
Subsidiary Revenue	31.4%	12.1%	-20.0%	-67.7%	0.0%
Additional DCF Drivers					
Gross Margin	37.1%	2.0%	33.5%	35.0%	32.0 - 34.0%
EBIT Margin	25.9%	2.5%	23.0%	19.0%	21.0%
Accounts Receivable (% of revenue)	20.6%	0.6%	19.0%	20.0%	20.0%
Dividend Payout Ratio	20.7%	2.6%	24.0%	24.0%	25.0 - 26.0%
Capital Expenditure Growth	68.4%	121.9%	4.0%	2.5%	4.0%

* As of this report, CRR has not yet disclosed 2008 Accounts Receivable, Dividend Payout, or Capital Expenditures.

Source: Company financial statements and disclosures

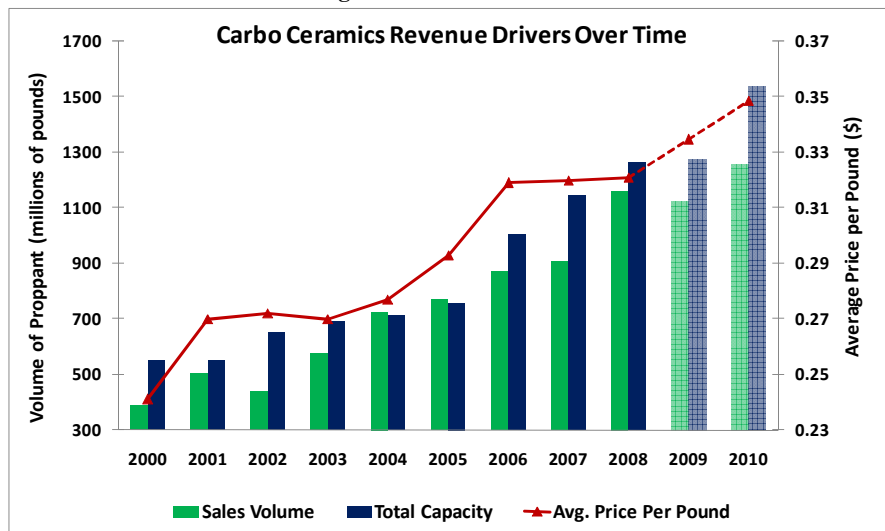
DCF Revenue Drivers

A key component of our discounted cash flows and sensitivity analysis is the pro-forma estimates of four key revenue drivers: total proppant sales volume, average price per pound of ceramic proppant, total capacity, and additional revenue from subsidiaries. The proppant revenue is capped by starting inventory plus total capacity.

- While proppant volume grew by over 28% in 2008, we expect the sales growth to be a modest 6% in 2009. A high percentage of this growth will come in the later part of the year and will be propelled by shale gas exploration, particularly in the Haynesville Shale. In 2010, we anticipate a larger 17% growth due to world economic recovery and resumption of major drilling projects by E&P companies. Subsequent years' volume growth was reduced on a straight-line basis to a steady state of 3% for conservative valuation.

- We do not expect the price of proppants to rise in 2009 due to reduced demand and management commentary. However, we expect price to increase in 2010 and thereafter as demand outpaces supply. 2010 has a high 9% price per pound increase, with subsequent years' rates reduced by 2% each until 2013. Figure 6 illustrates CRR's revenue drivers over time and in 2009 and 2010.

Figure 6- Revenue Drivers



Source: Company financial statements and disclosures

- CRR's subsidiary Pinnacle grew from 9.87% of total revenue in 2004 to 14.54% of total revenue in 2007. Since a large stake in Pinnacle was sold to Halliburton in July 2008, we expect this revenue source to decline sharply into the future. For 2009, we decreased the subsidiary revenue by 67.7% to account for the divestiture. However, the decreased revenues due to the sale are offset by proppant sales volume growth.
- We expect the Depreciation and Amortization (D&A) growth rate to decrease as CRR has sold some of its assets related to Pinnacle. The increase in assets, due to increased capacity expansion, will be offset by the decrease in assets sold related to the Pinnacle divestiture. The D&A growth rate decreases on a relatively constant basis until a 4% steady state in 2013.
- CRR's dividend payout ratio has been higher than industry standard. We expect a slight increase going forward.

Discount Rate

The discount rate, WACC, was derived using (Appendix 17):

- a 2.99% risk-free rate, based on the current 10 year Treasury yield
- a 5.30% expected market-risk premium, using Bloomberg
- a beta value of 1.33 (using weekly returns for 2008 against the S&P 500)
- WACC is equal to the cost of equity as the company does not hold any debt.

Terminal Value

The terminal value was calculated using the exit multiple method with EV/EBITDA (see Appendix 16). We believe that method is the most accurate method of predicting the terminal value, as the perpetuity growth method is subject to more significant unpredictable factors. The EV/EBITDA multiple attempts to calculate the liquidation value of the company at the end of 5 years. To estimate the exit multiple, we took the average of the five year historical EV/EBITDA ratios for seven other small cap oil field services companies (BJ Services, RPC, Exterran Holdings, Dril-Quip, Flotek, Lufkin, NGS) that we felt were in mature state. An exit value of 8.5 EV/EBITDA was thus used to calculate the base case terminal value of the company, which we feel properly captures the value of Carbo Ceramics in steady state at the end of 2013.

DCF Intrinsic Value

Our DCF analysis provides us with an intrinsic value of \$58.72 per share based on our base case (see Appendix 18 for further details). We assigned 50% weighting to our DCF in the final weighted average target price, as this valuation method allowed us the most model control in the valuation process.

Comparable Multiples Valuations

CRR does not have similar traded public companies in the United States. For our comparables analysis, we used Core Laboratories, RPC, Complete Production Services Inc, and Exterran Holdings. All of these companies are categorized as small oil field services companies providing specialized services to major energy companies such as Halliburton and Schlumberger.

Since CRR trades at a premium to many of these companies, we have also taken into consideration CRR's historical valuation multiples to estimate the future value of these ratios. We used four different valuation multiples: EV/EBITDA, price/earnings, price/sales, and price/book. Table 2 summarizes the multiples used in our comparables analysis.

Table 2

Comparable Multiples Used			
	Weak	Base	Best
EV / EBITDA	7.4x	10.2x	10.3x
Price / Earnings	14.8x	20.6x	25.2x
Price / Book	1.9x	2.8x	2.9x
Price / Sales	2.0x	3.0x	3.2x

Source: Multiples based on data taken from FactSet

The first multiple we used was EV/EBITDA. The one year average EV/EBITDA for CRR is 10.2 and the five year average is 13.7. The EV/EBITDA ratio of comparable companies for one year is 9.9, while the 5 year average is 15.8. This indicates that CRR trades at a premium with respect to its competitors in terms of the EV/EBITDA multiple. CRR's current EV/EBITDA ratio is 7.8, which can be accounted for by the fact that all stocks are trading at historically low valuations.

We expect multiple expansion to occur as the market for ceramic proppants expands and as CRR continues to take share from sand based competitors. Also, CRR trades at a premium with respect to its competitors because of its strong fundamentals and growth prospects. For our base case, we estimate the projected EV/EBITDA to be 10.2, which is equal to its last one year average. This 10.2 multiple differs from the 8.5 value we used to determine our DCF exit multiple because it attempts to capture current value with growth, and the 9.8x captures steady state terminal value. Our best case EV/EBITDA estimate is 13.7, which is the 5 year average. Our weak case estimate for EV/EBITDA is 7.4, the 5 year historic low for the company. We applied our base case multiple to LTM EBITDA and NTM EBITDA, and then averaged the two resulting EVs to arrive at a base case target price.

We used a similar methodology as in the EV/EBITDA calculations for our Price/Earnings, Prices/Sales, and Price/Book calculations. Since CRR does not have any debt in its capital structure, we believe that EV/EBITDA will be the most appropriate measure in our comparables valuation. We have therefore assigned a higher weight of 20% to EV/EBITDA and a lower weight of 10% to each of the other ratios in our overall price weighting calculations (see Appendix 19 for further details).

Weighted Average

Table 3 below summarizes the result of our valuation methods and their respective weightings, arriving at the final intrinsic value for CRR.

Table 3

Valuation Method	Price	Weight
DCF	\$58.72	50%
EV / EBITDA	\$46.85	20%
Price / Earnings	\$46.34	10%
Price / Book	\$51.90	10%
Price / Sales	\$51.10	10%
Intrinsic Value	\$53.67	100%

Sensitivity Analysis and Monte Carlo Simulation

The market's recent volatility makes sensitivity analysis for key inputs important. For sensitivity analysis in our DCF model, we used two layers. First we took two of the most sensitive inputs in our model (beta and terminal EV/EBITDA) and ran "worst case" and "best case" scenarios to compliment the base case described above. Then we took each of the nine permutations that resulted from our sensitivity analysis and ran a Monte Carlo Simulation analysis with our core revenue drivers as key inputs and stock price as the primary output.

Beta and EV/EBITDA Exit Multiple Sensitivity Analysis

Table 4 summarizes the rationale and projected price for our conservative, base, and aggressive cases for beta and EV/EBITDA. See Appendix 20 for more details on how different betas were calculated.

Table 4

		EV / EBITDA			
		Conservative (4.0x)	Base (8.5x)	Aggressive (10.5x)	
	Rationale	Lowest level of peer group in last five years	Average value of peer group over last year	Average value of peer group over 18 months	
Beta	Conservative (1.77)	Highest yearly beta over the last five years	\$33.69	\$53.02	\$61.61
	Base (1.33)	Yearly beta in 2008	\$36.58	\$58.72	\$68.56
	Aggressive (.65)	Lowest yearly beta over the last five years	\$42.09	\$69.59	\$81.81

Source: Multiples based on data taken from FactSet

This sensitivity analysis suggests the price range for the stock is between \$33.69 and \$81.81. A conservative EV/EBITDA and beta would result in a price decline of 13%, while an aggressive beta and EV/EBITDA would result in a price increase of 111%.

Monte Carlo Simulation

To further stress test the range of possible returns, we ran Monte Carlo simulations (using the statistical software suite “At Risk”) with three key revenue driver inputs for the years 2009-2013:

- Projected Sales Volume Growth
- Average Price Per Pound Growth
- Projected Gross Margin

We determined that a normal distribution was most appropriate for each driver, and used the base values forecasted in our DCF model as the mean value. We applied the average standard deviation of each value since 2000 and the primary relevant output for the simulation was stock price. This simulation was run nine times, one time each using the different variations of our conservative, base, and aggressive beta and EV/EBITDA terminal multiple cases. Table 5 below indicates the range of returns found at different points on the distribution curve. For instance, the 5% values indicate that there is less than a 5% likelihood the stock would have this return or lower, given the beta and EV/EBITDA assumptions:

Table 5

		EV/EBITDA			
		Conservative (4.0X)	Base (8.5X)	Aggressive (10.5x)	
Beta	Conservative 1.77	%			
		5%	\$26.10	\$38.43	\$44.30
		25%	\$29.87	\$45.23	\$52.26
		50%	\$32.98	\$51.57	\$59.36
		75%	\$36.59	\$58.16	\$69.08
	95%	\$43.74	\$74.68	\$85.91	
	Base 1.33	5%	\$28.09	\$42.39	\$48.05
		25%	\$31.90	\$49.83	\$57.96
		50%	\$35.58	\$56.96	\$66.55
		75%	\$40.42	\$65.62	\$77.09
	95%	\$49.06	\$81.06	\$97.11	
	Aggressive 0.65	5%	\$31.79	\$48.74	\$56.87
25%		\$36.59	\$58.83	\$68.82	
50%		\$41.19	\$67.28	\$78.71	
75%		\$46.22	\$78.89	\$92.33	
95%	\$56.45	\$99.09	\$113.96		

Legend

	Worse than -20%
	Between -10 and -20
	0 to -10%
	0 to 10%
	Between 10 and 20
	Greater than 20%

*-Returns Based on \$38.75 price (Feb 9 Close)

Current Price	\$38.75
Best Case Price	\$113.96
Worst Case Price	\$26.10
Base Case Price	\$56.96

In a worst case scenario, CRR will continue to lose market share overseas, will lose business to cheaper sand-based competitors and Saint-Gobain, and the macro outlook for oil and natural gas will further deteriorate. Under this scenario, volume growth for proppant will slow, the price per pound of ceramics will decline, and CRR’s market share will evaporate. Even under this worst case scenario, our sensitivity analysis indicates the company only has 33% downside (at a price of \$26.10) from its current price, while our base case suggests an average price of \$56.96, with 47% upside. We find this risk/reward analysis compelling in its own right, and even more appealing for the stock if our aggressive scenarios come to pass.

Appendix 1: Breakdown of Carbo’s Five Brands

Brand name	Usage	Strength/Weight	Relative Price	Comments
CARBOECONOPROP	Moderate depth oil wells	Lightweight	Low	<ul style="list-style-type: none"> • Carbo’s most widely used proppant • Competes directly with sand-based proppants • Aimed at the largest well population • Bulk density and specific gravity similar to frac sand, so its high conductivity makes it more cost-effective than resin coated sands
CARBOLITE	Moderate depth oil wells	Lightweight	Low	<ul style="list-style-type: none"> • Bulk density and specific gravity similar to sand, but highest fracture conductivity to moderate depths • Universally accepted as the ideal high performance proppant in oil wells
CARBOPROP	Moderate to deep gas wells	Intermediate strength	Premium	<ul style="list-style-type: none"> • The original cost-effective intermediate-strength proppant with excellent crush resistance in a broad range of applications
CARBOHSP	Deep gas wells	Highest strength of all CARBO brands	Premium	<ul style="list-style-type: none"> • For high fracture conductivity in deep, hot and hostile downhole environments
CARBOHYDROPROP	Slickwater fracturing	Lightweight	Low	<ul style="list-style-type: none"> • Priced similarly to resin-coated sand, but provides superior thermal stability (40-50% more conductivity)

Source: Company disclosures

Appendix 2: Carbo's Major Ceramic Competitors

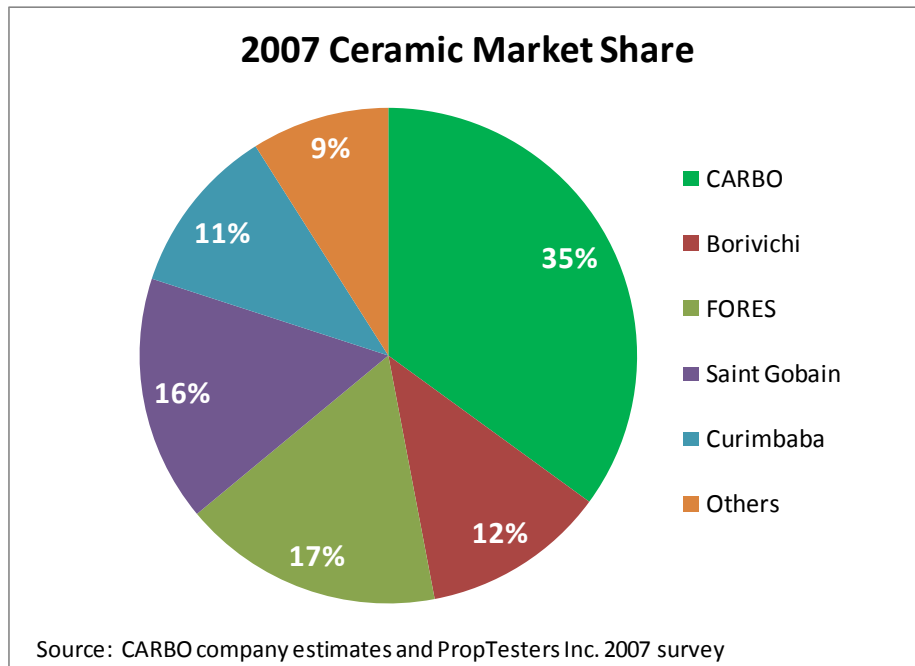
Carbo competes on a global scale, and is positioned on the high end of the proppant industry in terms of quality, which equates to price. Carbo offers a broad range of products to its customers, as does its main competitor in the ceramic space, French materials conglomerate Saint-Gobain. According to management, Carbo's largest global competition comes from Saint-Gobain and Brazilian manufacturer, Curimbaba. FORES, a private, Russian manufacturer, is a company to watch, as it has gained market share in the last few years, likely due to its expansion of product offerings. Borivichi (Russian) offers less variety in its product offerings, but still maintains high quality products, and should not be overlooked as a long-term competitor. Chinese competitors like Yixing and GuiZhou do not make up much of the global market share (less than 15% total for all Chinese ceramic producers) and the quality of Chinese proppant is low, so there is little demand for it in North America.

In the resin-coated sand space, Carbo views Hexion Specialty Chemicals and Santrol (a subsidiary of Fairmount Minerals Limited, Inc.) as competitors, while Unimin, Badger Mining, and Oglebay-Norton are all competitors in the sand proppant industry. While sand and resin-coated sand producers offer a high variety of products, their sand proppants are lower quality (and therefore, lower in price) when compared to ceramics.

	Saint-Gobain	FORES	Borivichi	Curimbaba
Public or private	Public	Private	Private	Private
Type of company	Materials conglomerate with five business sectors <ul style="list-style-type: none"> 75% of sales come from housing & construction markets Saint-Gobain Proppants is a business unit within one of Saint-Gobain's five sectors 	Ceramic proppant manufacturer	Refractories company (main products are not proppants)	Mining company <ul style="list-style-type: none"> Manufacture a diversified series of products for the petrochemical industry like ceramics, refractories & agrochemicals
Types of ceramics (range of products)	Broad range: Lightweight, Intermediate & High strength ceramics	Intermediate strength ceramics, ceramics with a polymeric coating & "superlight" ceramics	Intermediate strength	Primarily high strength (although seems to be selling a lightweight product as well)
Headquarters	France <ul style="list-style-type: none"> S-G Proppants headquartered in Fort Smith, Arkansas 	Russia	Russia	Brazil
Number of employees	206,000	Unavailable	5,500	800
International operations	U.S., China, Russia, Canada, Venezuela	Unavailable	Unavailable	Exports to the U.S., Europe & other countries in South America
Operations in U.S.	Yes	No	No	No

Source: Competitor websites

Appendix 3: Ceramic Market Share



Appendix 4: Carbo's Proppant Manufacturing Capacity

Location	Annual Capacity (Million lbs)	Products Produced	Raw Material Inputs
New Iberia, Louisiana	120	CARBOHSP CARBOPROP	Bauxite
Eufaula, Alabama	260	CARBOLITE CARBOECONOPROP	Kaolin
McIntyre, Georgia	275	CARBOLITE CARBOECONOPROP CARBOPROP CARBOHSP	Uncalcined Kaolin
Toombsboro, Georgia	500	CARBOECONOPROP CARBOHYDROPROP	Uncalcined Kaolin
Loyang, China	100	CARBOPROP CARBOLITE	Kaolin Bauxite
Kopeysk, Russia	100	CARBOPROP CARBOLITE	Uncalcined Bauxite
Total Current Capacity	1,355		

Source: Company financial statements and disclosures

Appendix 5: Summary of Investment Risks

Risk	Description	Severity Level	Stance
Drilling activity level	Drop in the number of natural gas and oil wells completed in geologic formations where ceramic proppants are used in fracture treatments	Moderate	Carbo has the liquidity and solvency strength to withstand a worst case scenario.
Commodity prices	Prolonged drop in the price of natural gas and oil	Moderate	The overall proppant market continues to grow in spite of plunging oil and gas prices, and we are confident Carbo can continue to realize growth due to projects in the Haynesville Shale and other fracture-intensive areas.
Development of alternative fracing techniques	Development of new process for the completion of natural gas and oil wells	Low	No known alternatives currently exist.
Undiversified customer base	Decline in sales or a loss of any of Carbo's three largest customers	High	This concentration is declining with the emergence of additional pressure pumping companies; however, Carbo should continue to diversify its customer base through its technical marketing and consulting efforts.
Patent protection	Expiration or lack of enforcement of one of Carbo's key patents	Moderate	Carbo faces losing its competitive advantage in international markets, as the governments of developing nations like China, Russia, and Brazil do not enforce Western IP rights in a stringent manner.
International business	Damage to Carbo's international operations and/or production capacity by international operating factors like: <ul style="list-style-type: none"> • economic or political instability • changes in regulations • trade barriers • currency rate fluctuations 	High	The recent decline in Carbo's overseas volume and plant reductions in China portend future challenges.

Source: Company disclosures

Appendix 6: Correlation Analysis Details
5 Years Data

	<i>CRR</i>	<i>HAL</i>	<i>BJS</i>	<i>SLB</i>	<i>Gas</i>	<i>Oil</i>
<i>CRR</i>	1					
<i>HAL</i>	0.578184	1				
<i>BJS</i>	0.579646	0.776316	1			
<i>SLB</i>	0.619262	0.715397	0.624297	1		
<i>Gas</i>	0.163426	0.197346	0.257506	0.155906	1	
<i>Oil</i>	0.485038	0.518058	0.471989	0.518256	0.18808101	1

Weekly returns were used to calculate the correlation between CRR, its three major customers (Halliburton (HAL), BJ Services (BJS), and Schlumberger (SLB)), and with oil and gas commodity prices. Over the past five years there is significant correlation between the performance of CRR and its major customers. In addition, the correlation with CRR's return and oil is also significant. This data indicates that as the price of oil increases, proppant sales increase, resulting in increased performance for CRR.

2008 Data

	<i>CRR</i>	<i>HAL</i>	<i>BJS</i>	<i>SLB</i>	<i>Gas</i>	<i>Oil</i>
<i>CRR</i>	1					
<i>HAL</i>	0.676127	1				
<i>BJS</i>	0.609638	0.836608	1			
<i>SLB</i>	0.747278	0.772303	0.557161	1		
<i>Gas</i>	0.257002	0.287929	0.321759	0.278218	1	
<i>Oil</i>	0.677432	0.655557	0.511579	0.659577	0.329581	1

When we look at the same returns over the most recent year (2008), we see that all correlations increased. In the short term, CRR's performance is tied even more strongly to the performance of its major customers and oil. CRR's share price will rise and fall with the market's sentiment of its major customers.

Appendix 7: Ratio Analysis

Profitability	Carbo Ceramics Inc.	BJ Services Co.	Complete Production Services In	Exterran Holdings Inc.	Helix Energy Solutions Group Inc	RPC Inc.	Core Laboratories N.V.
Gross Margin	35.0	23.3	32.6	22.4	34.7	35.3	30.1
EBIT Margin	23.9	16.7	19.2	6.7	31.3	20.9	27.4
Net Margin	15.8	11.2	9.8	1.4	18.1	12.6	18.1

Leverage	Carbo Ceramics Inc.	BJ Services Co.	Complete Production Services In	Exterran Holdings Inc.	Helix Energy Solutions Group Inc	RPC Inc.	Core Laboratories N.V.
Interest Coverage	0.0	32.3	5.1	1.3	9.3	34.5	72.1
Debt to Equity	0.0	16.2	90.5	73.8	94.7	38.2	487.6

Liquidity	Carbo Ceramics Inc.	BJ Services Co.	Complete Production Services In	Exterran Holdings Inc.	Helix Energy Solutions Group Inc	RPC Inc.	Core Laboratories N.V.
Working Capital	111.0	940.9	258.8	670.5	48.3	144.3	122.8
Current Ratio	4.3	1.9	2.5	1.8	1.1	2.6	2.3
Quick Ratio	2.7	1.4	2.2	1.3	1.0	2.3	2.0
Cash Ratio	37.0	14.7	8.1	19.6	13.2	7.0	26.1

Growth Ratios	Carbo Ceramics Inc.	BJ Services Co.	Complete Production Services In	Exterran Holdings Inc.	Helix Energy Solutions Group Inc	RPC Inc.	Core Laboratories N.V.
Sales Growth	+ 9.0	+ 13.0	+ 36.5	+ 58.3	+ 29.3	+ 15.7	+ 18.5
EBITDA Growth	+ 2.7	- 13.8	+ 35.2	+ 7.2	+ 8.5	- 1.5	+ 46.9
EBIT Growth	- 2.9	- 21.5	+ 24.0	- 20.0	- 11.1	- 19.7	+ 51.4
EPS Growth	- 0.9	- 18.1	+ 8.9	- 6.3	- 13.7	- 21.2	+ 64.4
Net Income Growth	- 0.7	- 19.1	+ 17.7	- 59.7	- 7.7	- 21.4	+ 49.1

Efficiency	Carbo Ceramics Inc.	BJ Services Co.	Complete Production Services In	Exterran Holdings Inc.	Helix Energy Solutions Group Inc	RPC Inc.	Core Laboratories N.V.
Sales to Working Capital	3.1	5.8	6.4	3.8	36.6	4.8	5.8
Total Asset Turnover	0.8	1.0	0.8	0.4	0.3	1.0	1.5
Accts Receivable Turnover	5.1	5.0	5.3	4.6	3.9	4.1	5.4
Inventory Turnover	4.7	8.4	22.1	5.5	68.7	17.6	15.8
Operating Cycle	149.2	116.7	86.0	146.6	98.6	109.9	90.3

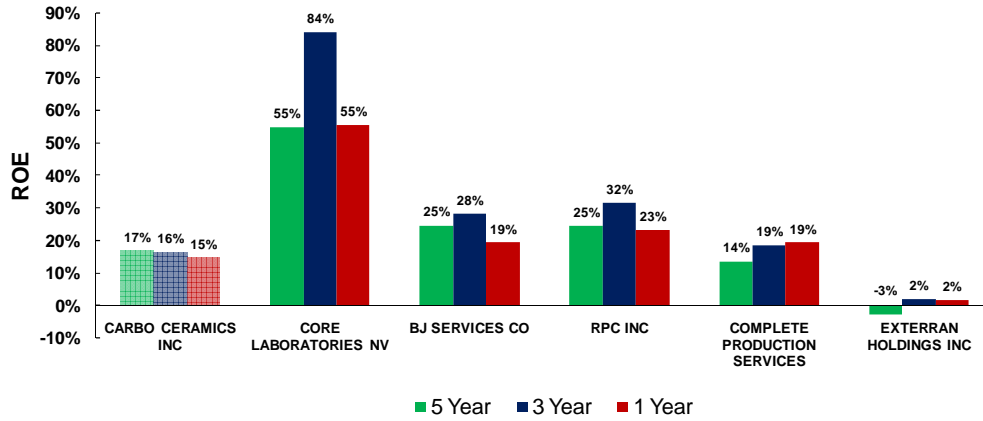
Returns	Carbo Ceramics Inc.	BJ Services Co.	Complete Production Services In	Exterran Holdings Inc.	Helix Energy Solutions Group Inc	RPC Inc.	Core Laboratories N.V.
Net Return on Assets	11.9	11.5	7.9	0.5	5.9	12.4	26.8
Net Return on Equity	13.8	17.7	17.4	1.1	16.9	21.3	206.2

Source: FactSet

Appendix 8: Dupont Analysis

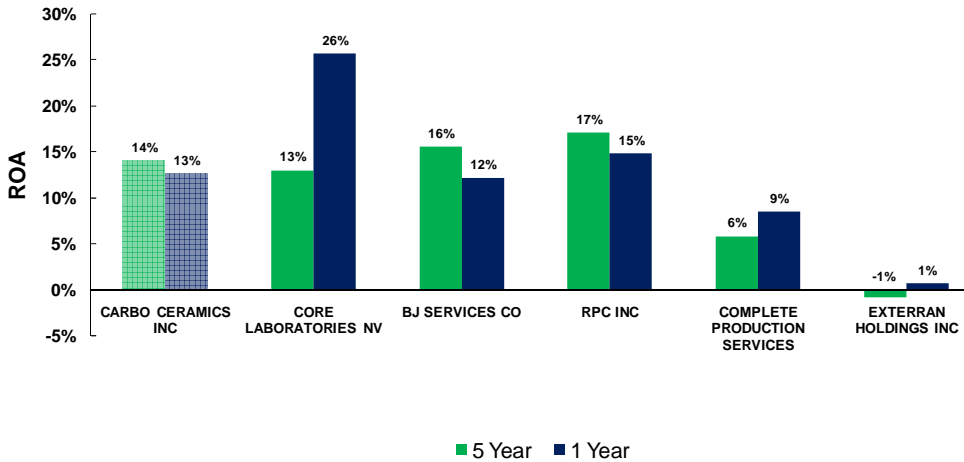
Compared to its peer group, Carbo performs much better relatively in ROA compared with ROE. This is primarily because the company is less levered than its peer group and thus has higher equity in general. Breaking down the ROE number into Dupont form (net margin X asset turnover X leverage multiple) further underscores Carbo’s relative lack of leverage (low assets to equity and high profit margin).

Average ROE Over 5, 3, and 1 Year



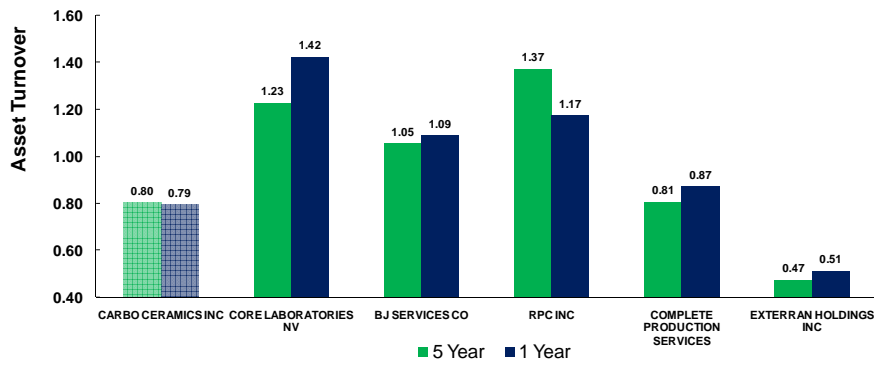
Data obtained from FactSet

Average ROA Over 5 and 1 Year

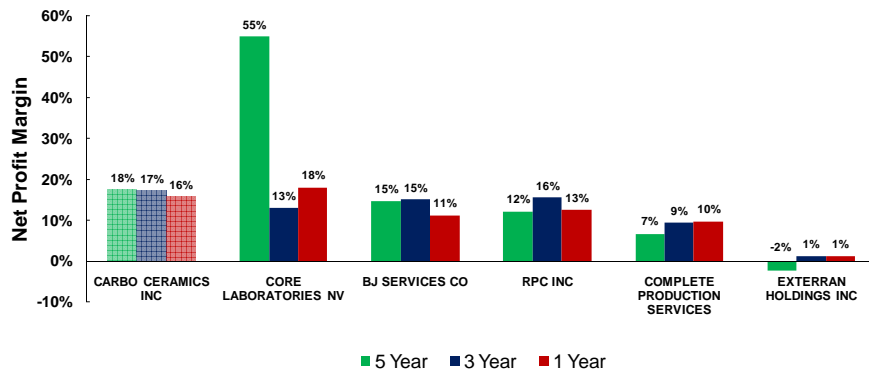


Data obtained from FactSet

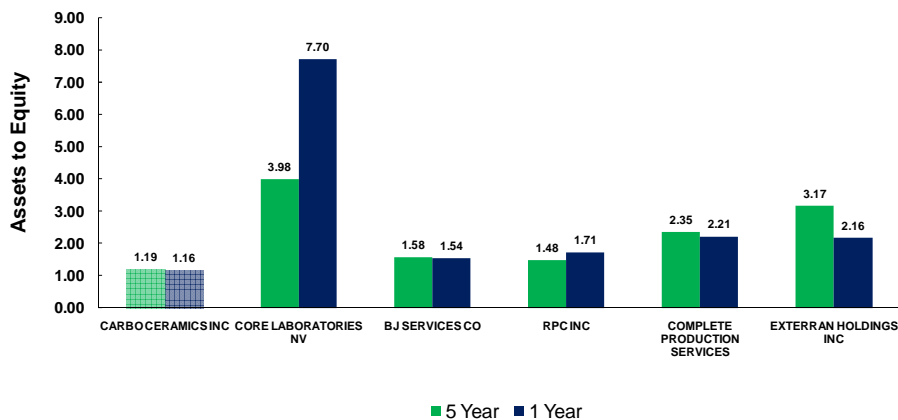
Average Total Asset Turnover Over 5 and 1 Year



Average Net Profit Margin Over 5, 3, and 1 Year



Average Assets to Equity Over 5 and 1 Year



Appendix 9: Income Statement

\$ in thousands

Income Statement	Actual				Projected Annual Forecast									
	2004 12/31/04	2005 12/31/05	2006 12/31/06	2007 12/31/07	2008 12/31/08	Q1 2009	Q2 2009	Q3 2009	Q4 2009	2009 12/31/09	2010 12/31/10	2011 12/31/11	2012 12/31/12	2013 12/31/13
Total Revenues														
Total proppant volume	727,308.3	770,481.2	868,812.5	906,102.8	1,163,930.0	209,740.2	222,077.8	370,129.7	431,818.0	1,233,765.8	1,443,506.0	1,587,856.6	1,714,885.1	1,817,778.2
Average price per pound proppant	0.276	0.293	0.320	0.321	0.321	0.321	0.321	0.321	0.321	0.321	0.350	0.374	0.393	0.405
Proppant revenues	201,039.0	225,751.0	278,020.0	290,859.0	373,494.8	67,303.8	71,262.8	118,771.3	138,566.6	395,904.5	504,897.0	594,263.8	673,895.1	735,758.7
Software + Consulting + Geo Technical Monitoring	22,015.0	26,922.0	34,106.0	49,492.0	39,599.2	2,176.3	2,304.3	3,840.5	4,480.6	12,801.8	12,801.8	12,801.8	12,801.8	12,801.8
Total revenues	223,054.0	252,673.0	312,126.0	340,351.0	413,094.0	69,480.1	73,567.1	122,611.9	143,047.2	408,706.3	517,698.8	607,065.6	686,696.9	748,560.5
Cost of goods sold	131,648.0	153,941.0	196,133.0	221,202.0	274,749.0	45,162.0	47,818.6	79,697.7	92,980.7	265,659.1	336,504.2	400,663.3	460,086.9	509,021.1
Selling, general, & administrative	24,864.0	27,245.0	34,732.0	39,615.0	43,502.0	11,116.8	11,770.7	19,617.9	22,887.6	65,393.0	72,477.8	78,918.5	82,403.6	82,341.7
EBIT	66,542.0	71,487.0	81,261.0	79,534.0	94,843.0	13,201.2	13,977.8	23,296.3	27,179.0	77,654.2	108,716.7	127,483.8	144,206.4	157,197.7
Interest expense	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest Income	570.0	1756.0	1590.0	419.0	491.0	164.1	173.7	289.6	337.8	965.2	965.2	965.2	965.2	965.2
Other Net						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Start Up Cost	0.0	-1092.0	-474.0	(1215.0)	(1108.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loss on disposal or write-off of assets	(1,144.0)	-95.0	1387.0	(268.0)	(1735.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Foreign currency exchange gain / (loss)	0.0	-147.0	84.0	2882.0	282.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Earnings in equity-method investee	0.0	208.0	-34.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Income	254.0	-34.0		48.0	558.0	(340.5)	(360.5)	(600.9)	(701.1)	(2003.0)	(2003.0)	(2003.0)	(2003.0)	(2003.0)
Total Other Net	(890.0)	(1,160.0)	963.0	1,447.0	(2,003.0)	(340.5)	(360.5)	(600.9)	(701.1)	(2,003.0)	(2,003.0)	(2,003.0)	(2,003.0)	(2,003.0)
Pretax income	66,222.0	72,083.0	83,814.0	81,400.0	93,331.0	13,024.8	13,791.0	22,984.9	26,815.7	76,616.4	107,678.9	126,446.0	143,168.6	156,159.9
Taxes	24,549.0	25,463.0	29,561.0	27,530.0	29,880.0	4,171.0	4,416.4	7,360.6	8,587.4	24,535.4	34,482.7	40,492.6	45,847.8	50,008.1
Equity in Affiliates After Tax (enter as +)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minority Interest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Income From Discounted Operations	0.0	0.0	0.0	0.0	46,754.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Income	41,673.0	46,620.0	54,253.0	53,870.0	110,205.0	8,853.8	9,374.6	15,624.3	18,228.4	52,081.0	73,196.2	85,953.3	97,320.7	106,151.8
Basic shares outstanding	23,868.1	24,004.5	24,280.7	24,367.0	24,104.7	24,104.7	24,104.7	24,104.7	24,104.7	23,004.7	23,004.7	23,004.7	23,004.7	23,004.7
Diluted shares outstanding	24,065.0	24,177.0	24,401.0	24,484.0	24,189.7	24,189.7	24,189.7	24,189.7	24,189.7	24,189.7	24,189.7	24,189.7	24,189.7	24,189.7
Basic EPS	\$1.746	\$1.942	\$2.234	\$2.211	\$4.57	\$0.38	\$0.41	\$0.68	\$0.79	\$2.26	\$3.18	\$3.74	\$4.23	\$4.61
Diluted EPS	\$1.732	\$1.928	\$2.223	\$2.200	\$4.56	\$0.37	\$0.39	\$0.65	\$0.75	\$2.15	\$3.03	\$3.55	\$4.02	\$4.39
Nonrecurring charges per share	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Depreciation & Amortization	12,177.0	13,624.0	19,517.0	24,762.0	30,457.3	6,109.7	6,469.1	10,781.9	12,578.8	35,939.6	41,330.5	45,463.6	48,191.4	50,119.0
EBITDA	78,719.0	85,111.0	100,778.0	104,296.0	125,300.3	19,310.9	20,446.9	34,078.1	39,757.8	113,593.8	150,047.3	172,947.3	192,397.7	207,316.7

Source: Company financial statements and disclosures

Appendix 10: Model Drivers

\$ in thousands

Projection assumptions	Actual				Projected Annual Forecast					
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Revenue										
Proppant volume growth		5.94%	12.76%	4.29%	28.45%	6.0%	17.0%	10.0%	8.0%	6.0%
Average price per pound growth		6.00%	9.215%	0.313%	-0.034%	0.0%	9.0%	7.0%	5.0%	3.0%
Proppant revenue growth		12.29%	23.15%	4.62%	28.41%	6.00%	27.53%	17.70%	13.40%	9.18%
Subsidiary revenue growth		22.29%	26.68%	45.11%	-19.99%	-67.7%	0.0%	0.0%	0.0%	0.0%
Revenue growth (%)		13.3%	23.5%	9.0%	21.4%	-1.1%	26.7%	17.3%	13.1%	9.0%
Gross profit margin (%)		39.1%	37.2%	35.0%	33.5%	35.0%	35.0%	34.0%	33.0%	32.0%
EBIT margin (%)		28.3%	26.0%	23.4%	23.0%	19.0%	21.0%	21.0%	21.0%	21.0%
Marginal Tax rate (%)		37.1%	35.3%	35.3%	33.8%	32.0%	32.0%	32.0%	32.0%	32.0%
Accounts receivable (% of sales)			21.3%	20.3%	20.3%	19.0%	20.0%	20.0%	20.0%	20.0%
D&A growth (%)			11.9%	43.3%	26.9%	23.0%	18.0%	15.0%	10.0%	6.0%
Capital expenditures growth (%)			208.9%	3.9%	-7.7%	4.0%	2.5%	4.0%	4.0%	4.0%
Dividends data										
Common dividends	7,001.0	8,759.0	10,717.0	12,723.0	26,449.2	12,499.4	18,299.1	22,347.9	25,303.4	27,599.5
Dividend payout ratio	16.8%	18.8%	19.8%	23.6%	24.0%	24.0%	25.0%	26.0%	26.0%	26.0%
Dividend Growth Rate		2.0%	1.0%	3.9%	1.6%	0.0%	4.2%	4.0%	0.0%	0.0%
Preferred dividends	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Company financial statements and disclosures

Appendix 11: Balance Sheet

\$ in thousands

	Actual				Projected Annual Forecast					
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Cash and equivalents (excl. investment securities)	33,990.0	19,695.0	24,973.0	12,296.0	139,275.6	142,292.8	139,458.0	147,799.4	165,576.1	191,992.7
Short Term Investment	46,125.0	41,975.0	7,500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Accounts receivable	41,191.0	53,918.0	63,461.0	68,950.0	78,487.9	81,741.3	103,539.8	121,413.1	137,339.4	149,712.1
Inventories	21,192.0	26,471.0	40,783.0	53,987.0	67,055.8	64,837.3	82,127.9	97,786.7	112,289.7	124,232.7
Deferred income taxes	2,552.0	3,795.0	4,650.0	6,451.0	7,001.7	5,749.3	8,080.2	9,488.5	10,743.3	11,718.2
Prepaid expenses	1,232.0	2,433.0	2,558.0	2,588.0	2,841.9	4,272.0	4,734.9	5,155.7	5,383.3	5,379.3
Other current assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Current Assets	146,282.0	148,287.0	143,925.0	144,272.0	294,662.8	298,892.6	337,940.8	381,643.3	431,331.9	483,035.0
PP&E	125,385.0	179,500.0	231,748.0	275,826.0	171,448.1	205,578.8	237,091.6	267,355.3	297,890.5	329,617.4
Goodwill	21,840.0	21,840.0	21,840.0	23,213.0	23,213.0	23,213.0	23,213.0	23,213.0	23,213.0	23,213.0
Intangibles	4,010.0	6,169.0	7,152.0	9,812.0	12,472.0	15,132.0	17,792.0	20,452.0	23,112.0	25,772.0
Other non-current assets		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Assets	297,517.0	355,796.0	404,665.0	453,123.0	501,795.9	542,816.4	616,037.4	692,663.6	775,547.4	861,637.4
Accounts payable	10,454.0	11,277.0	12,939.0	11,709.0	14,543.4	14,062.3	17,812.4	21,208.5	24,354.0	26,944.3
Accrued expenses	12,687.0	12,023.0	13,459.0	15,031.0	16,505.8	24,811.9	27,500.0	29,943.8	31,266.2	31,242.6
Taxes payable	5,595.0	9,998.0	3,172.0	2,474.0	2,685.2	2,204.9	3,098.8	3,638.9	4,120.1	4,494.0
Other current liabilities (non-debt)	456.0	3,011.0	4,676.0	4,050.0	4,050.0	4,050.0	4,050.0	4,050.0	4,050.0	4,050.0
Deferred income taxes	23,958.0	26,121.0	27,560.0	30,420.0	33,016.7	27,111.0	38,102.6	44,743.4	50,660.8	55,257.8
Other non-current liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Liabilities	53,150.0	62,430.0	61,806.0	63,684.0	70,801.1	72,240.0	90,563.8	103,584.6	114,451.1	121,988.7
Minority interest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Convertible Preferred Stock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Common Stock and APIC	91,006.0	102,779.0	105,028.0	108,931.0	108,931.0	108,931.0	108,931.0	108,931.0	108,931.0	108,931.0
Treasury stock (contra account)	0.0	0.0	0.0	0.0	(42,200.0)	(42,200.0)	(42,200.0)	(42,200.0)	(42,200.0)	(42,200.0)
Accumulated other comprehensive income	(31.0)	526.0	2,099.0	3,629.0	3,629.0	3,629.0	3,629.0	3,629.0	3,629.0	3,629.0
Unearned stock compensation	(943.0)	(2,135.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Retained earnings	154,335.0	192,196.0	235,732.0	276,879.0	360,634.8	400,216.4	455,113.5	518,719.0	590,736.3	669,288.7
Total Shareholders' Equity	244,367.0	293,366.0	342,859.0	389,439.0	430,994.8	470,576.4	525,473.5	589,079.0	661,096.3	739,648.7
Total Liabilities + Shareholders' Equity	297,517.0	355,796.0	404,665.0	453,123.0	501,795.9	542,816.4	616,037.4	692,663.6	775,547.4	861,637.4
Balance check	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Company financial statements and disclosures

Appendix 12: Supporting Schedules

\$ in thousands

	Actual				Projected Annual Forecast					
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Intangible assets										
Acquisition of intangibles		2,834.0	1,788.0	3,404.0	3,404.0	3,404.0	3,404.0	3,404.0	3,404.0	3,404.0
Amortization		(675.0)	(805.0)	(744.0)	(744.0)	(744.0)	(744.0)	(744.0)	(744.0)	(744.0)
Intangibles	4,010.0	6,169.0	7,152.0	9,812.0	12,472.0	15,132.0	17,792.0	20,452.0	23,112.0	25,772.0
PP&E										
Capital expenditures	(21,950.0)	(67,811.0)	(70,460.0)	(65,034.0)	(67,635.4)	(69,326.2)	(72,099.3)	(74,983.3)	(77,982.6)	(81,101.9)
Asset sales	0.0	0.0	0.0	0.0	(142,300.0)	0.0	0.0	0.0	0.0	0.0
Depreciation		(12,949.0)	(18,712.0)	(24,018.0)	(29,713.3)	(35,195.6)	(40,586.5)	(44,719.6)	(47,447.4)	(49,375.0)
PP&E	125,385.0	179,500.0	231,748.0	275,826.0	171,448.1	205,578.8	237,091.6	267,355.3	297,890.5	329,617.4

Source: Company financial statements and disclosures

Appendix 13: Pro-forma Cash Flow Statement

\$ in thousands

Cash Flow Statement	Actual			Projected Annual Forecast					
	2005	2006	2007	2008	2009	2010	2011	2012	2013
Net Income	46,620.0	54,253.0	53,870.0	110,205.0	52,081.0	73,196.2	85,953.3	97,320.7	106,151.8
Depreciation & amortization	13,624.0	19,517.0	24,762.0	30,457.3	35,939.6	41,330.5	45,463.6	48,191.4	50,119.0
Changes in working capital									
Accounts receivable	(12,727.0)	(9,543.0)	(5,489.0)	(9,537.9)	(3,253.4)	(21,798.5)	(17,873.4)	(15,926.3)	(12,372.7)
Inventories	(5,279.0)	(14,312.0)	(13,204.0)	(13,068.8)	2,218.5	(17,290.6)	(15,658.8)	(14,503.1)	(11,943.0)
Prepaid expenses	(1,201.0)	(125.0)	(30.0)	(253.9)	(1,430.1)	(462.8)	(420.8)	(227.7)	4.0
Other current assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Accounts payable	823.0	1,662.0	(1,230.0)	2,834.4	(481.2)	3,750.1	3,396.2	3,145.5	2,590.3
Accrued expenses	(664.0)	1,436.0	1,572.0	1,474.8	8,306.0	2,688.2	2,443.8	1,322.3	(23.5)
Taxes payable	4,403.0	(6,826.0)	(698.0)	211.2	(480.3)	893.9	540.1	481.2	373.9
Other current liabilities	2,555.0	1,665.0	(626.0)	0.0	0.0	0.0	0.0	0.0	0.0
Deferred tax assets	(1,243.0)	(855.0)	(1,801.0)	(550.7)	1,252.4	(2,330.9)	(1,408.3)	(1,254.9)	(974.9)
Deferred tax liabilities	2,163.0	1,439.0	2,860.0	2,596.7	(5,905.7)	10,991.6	6,640.8	5,917.4	4,597.0
Equity income in affiliates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minority interest expense	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cash from operations	49,074.0	48,311.0	59,986.0	124,368.2	88,246.9	90,967.6	109,076.5	124,466.7	138,521.9
Purchase of fixed assets (capital expenditures)	(21,950.0)	(70,460.0)	(65,034.0)	(67,635.4)	(69,326.2)	(72,099.3)	(74,983.3)	(77,982.6)	(81,101.9)
Proceeds from sale of fixed assets	0.0	0.0	0.0	142,300.0	0.0	0.0	0.0	0.0	0.0
Purchase of intangible assets	(2,834.0)	(1,788.0)	(3,404.0)	(3,404.0)	(3,404.0)	(3,404.0)	(3,404.0)	(3,404.0)	(3,404.0)
Other long-term assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cash from investing	(24,784.0)	(72,248.0)	(68,438.0)	71,260.6	(72,730.2)	(75,503.3)	(78,387.3)	(81,386.6)	(84,505.9)
Convertible preferred stock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Common stock and APIC	11,773.0	2,249.0	3,903.0	0.0	0.0	0.0	0.0	0.0	0.0
Treasury stock repurchases	0.0	0.0	0.0	(42,200.0)	0.0	0.0	0.0	0.0	0.0
Comprehensive accumulated loss	557.0	1,573.0	1,530.0	0.0	0.0	0.0	0.0	0.0	0.0
Other equity account	(1,192.0)	2,135.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Common and preferred dividends	(8,759.0)	(10,717.0)	(12,723.0)	(26,449.2)	(12,499.4)	(18,299.1)	(22,347.9)	(25,303.4)	(27,599.5)
Increases / (decreases) in debt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cash from financing	2,379.0	(4,760.0)	(7,290.0)	(68,649.2)	(12,499.4)	(18,299.1)	(22,347.9)	(25,303.4)	(27,599.5)
Total increase/decrease of cash	26,669.0	(28,697.0)	(15,742.0)	126,979.6	3,017.2	(2,834.7)	8,341.4	17,776.7	26,416.6

Source: Company financial statements and disclosures

Appendix 14: Working Capital Analysis

\$ in thousands

Working capital and ROIC analysis

	Actual				Projected Annual Forecast					
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Working capital assets (excl. cash)	63,615.0	82,822.0	106,802.0	125,525.0	148,385.6	150,850.6	190,402.5	224,355.4	255,012.4	279,324.1
Working capital liabilities	29,192.0	36,309.0	34,246.0	33,264.0	37,784.4	45,129.0	52,461.2	58,841.2	63,790.3	66,730.9
Net Working capital	34,423.0	46,513.0	72,556.0	92,261.0	110,601.1	105,721.6	137,941.3	165,514.2	191,222.1	212,593.2
PP&E	125,385.0	179,500.0	231,748.0	275,826.0	171,448.1	205,578.8	237,091.6	267,355.3	297,890.5	329,617.4
Goodwill	21,840.0	21,840.0	21,840.0	23,213.0	23,213.0	23,213.0	23,213.0	23,213.0	23,213.0	23,213.0
Intangibles	4,010.0	6,169.0	7,152.0	9,812.0	12,472.0	15,132.0	17,792.0	20,452.0	23,112.0	25,772.0
Total invested capital	185,658.0	254,022.0	333,296.0	401,112.0	317,734.2	349,645.3	416,037.9	476,534.5	535,437.6	591,195.5
ROIC	18.3%	15.8%	13.4%	20.9%	13.7%	19.8%	19.2%	19.1%	18.6%	18.6%
Working capital / Revenues	16.0%	19.1%	24.2%	24.6%	26.5%	23.5%	25.0%	26.0%	27.0%	27.0%
Reinvestment rate	50.0%	149.7%	118.4%	-125.6%	66.7%	80.7%	66.1%	57.5%	50.6%	50.6%

Appendix 15: Discounted Cash Flows

\$ in thousands

Discounted Cash Flows

	Actual				Projected Annual Forecast					
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	12/31/04	12/31/05	12/31/06	12/31/07	12/30/08	12/30/09	12/30/10	12/30/11	12/30/12	12/30/13
EBIT	66,542.0	71,487.0	81,261.0	79,534.0	94,843.0	77,654.2	108,716.7	127,483.8	144,206.4	157,197.7
Normalized reported taxes	24,549.0	25,463.0	29,561.0	27,530.0	29,880.0	24,535.4	34,482.7	40,492.6	45,847.8	50,008.1
Plus: tax shield on interest expense	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Less: tax on nonoperating income	329.9	409.8	(339.6)	(489.4)	641.4	641.4	641.4	641.4	641.4	641.4
Operating taxes	24,878.9	25,872.8	29,221.4	27,040.6	30,521.4	25,176.8	35,124.2	41,134.1	46,489.3	50,649.6
Plus: increases in deferred tax assets		1,243.0	855.0	1,801.0	550.7	(1,252.4)	2,330.9	1,408.3	1,254.9	974.9
Less: increases in deferred tax liabilities		(2,163.0)	(1,439.0)	(2,860.0)	(2,596.7)	5,905.7	(10,991.6)	(6,640.8)	(5,917.4)	(4,597.0)
Operating cash taxes		24,952.8	28,637.4	25,981.6	28,475.4	29,830.1	26,463.5	35,901.6	41,826.8	47,027.4
EBIAT (NOPAT)		46,534.2	52,623.6	53,552.4	66,367.6	47,824.1	82,253.2	91,582.2	102,379.6	110,170.3
Plus: Depreciation & Amortization		13,624.0	19,517.0	24,762.0	30,457.3	35,939.6	41,330.5	45,463.6	48,191.4	50,119.0
Less: Accounts receivable increases		(12,727.0)	(9,543.0)	(5,489.0)	(9,537.9)	(3,253.4)	(21,798.5)	(17,873.4)	(15,926.3)	(12,372.7)
Less: Inventories increases		(5,279.0)	(14,312.0)	(13,204.0)	(13,068.8)	2,218.5	(17,290.6)	(15,658.8)	(14,503.1)	(11,943.0)
Less: Prepaid expenses increases		(1,201.0)	(125.0)	(30.0)	(253.9)	(1,430.1)	(462.8)	(420.8)	(227.7)	4.0
Less: Other current assets increases		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plus: Accounts payable increases		823.0	1,662.0	(1,230.0)	2,834.4	(481.2)	3,750.1	3,396.2	3,145.5	2,590.3
Plus: Accrued expenses increases		(664.0)	1,436.0	1,572.0	1,474.8	8,306.0	2,688.2	2,443.8	1,322.3	(23.5)
Plus: Taxes payable increases		4,403.0	(6,826.0)	(698.0)	211.2	(480.3)	893.9	540.1	481.2	373.9
Plus: Other current liabilities increases		2,555.0	1,665.0	(626.0)	0.0	0.0	0.0	0.0	0.0	0.0
Plus: working capital (increases) / decreases		(12,090.0)	(26,043.0)	(19,705.0)	(18,340.1)	4,879.6	(32,219.8)	(27,572.9)	(25,707.9)	(21,371.0)
Less: Gross Reinvestment		(24,784.0)	(72,248.0)	(68,438.0)	71,260.6	(72,730.2)	(75,503.3)	(78,387.3)	(81,386.6)	(84,505.9)
Free cash flow		23,284.2	(26,150.4)	(9,828.6)	149,745.4	15,913.0	15,860.7	31,085.6	43,476.5	54,412.4
PV of FCF on valuation date		256,180.3								

Appendix 16: Exit Multiples

\$ in thousands

Exit multiple method

Exit EV / EBITDA multiple	8.5x	
Terminal value		1,762,192.1
PV of terminal value		985,732.7
Implied long term growth rate		7.6%
Implied ROIC		25.3%

Source: Data for multiple taken from FactSet

Appendix 17: WACC Analysis

\$ in thousands

Analysis of WACC

	Current capital structure		Target capital structure		% Cost	Tax Rate
	Market value	% Weight	override	% Weight		
Target Debt	0.0	0.0%		0.0%	6.0%	30.5%
Target Market Equity	1,306,630.4	100.0%		100.0%	12.3%	
Total capital	1,306,630.4				12.3%	

Cost of equity

	Rate	Source
Risk-Free Rate (rf)	3.0%	10-yr T-bond
Market Risk (rm)	10.0%	Bloomberg
Market Risk Premium (rm-rf)	7.0%	
Observed beta	1.33	

Source: Bloomberg

Appendix 18: Equity Value Calculations

\$ in thousands

Equity value calculations

Enterprise value (value of operating assets)	1,241,913.0
Excess cash	142,292.8
Equity in affiliates	0.0
Other non-current assets	0.0
Total nonoperating assets	142,292.8
Value of operating and nonoperating assets	1,384,205.8
Equity value	1,384,205.8
Equity value / share	\$58.72

Appendix 19: Comparables Analysis

Comps - FactSet

Company: Carbo Ceramics Inc.
 Ticker: CRR

Today's Date: 12/30/2008

Ticker	Company	Last Price	52-wk High	52-wk Low	% of 52-wk High	Market Value (\$mm)	Enterprise Value (\$mm)	Price / EPS		EV / EBITDA		Price / Book		Price / Sales	
								LTM (x)	NTM (x)	LTM (x)	LTM (x)	LTM (x)	LTM (x)		
CLB	Core Laboratories N.V.	\$67.48	\$146.47	\$48.52	46%	\$1,389	\$1,581	11.2x	11.8x	8.0x	15.0x	2.1x	2.1x	0.6x	0.6x
BJS	BJ Services Co.	\$12.31	\$34.94	\$8.34	35%	\$3,348	\$3,754	5.5x	9.6x	3.2x	1.0x	0.6x	1.1x	0.3x	0.3x
RES	RPC Inc.	\$7.29	\$18.91	\$6.02	39%	\$935	\$1,085	11.2x	28.4x	4.9x	2.1x	1.1x	0.3x	0.3x	
CPX	Complete Production Services Inc.	\$5.31	\$37.84	\$4.04	14%	\$557	\$1,385	3.5x	13.7x	3.1x	0.5x	0.3x	0.3x	0.3x	
EXH	Exterran Holdings Inc.	\$23.59	\$82.90	\$11.97	28%	\$1,342	\$3,709	7.1x	11.2x	8.8x	0.4x	0.4x	0.4x	0.4x	
Mean								7.7x	15.0x	5.6x	3.8x	0.9x	0.9x	0.6x	0.6x
Median								7.1x	11.8x	5.0x	1.0x	0.6x	0.6x	0.6x	0.6x
CRR	Carbo Ceramics Inc.	\$34.45	\$62.57	\$30.38	55%	\$845	\$832	15.9x	15.2x	7.8x	2.0x	2.1x	2.1x	2.1x	2.1x

Price / Earnings

Current P/E Ratio	LTM			NTM		
	Conservative	Base	Aggressive	Conservative	Base	Aggressive
15.9x						
Earnings Per Share	\$2.24	\$2.37	\$2.51	\$1.69	\$2.14	\$2.20
Projected Multiple	14.8x	20.6x	25.2x	14.8x	20.6x	25.2x
Implied Share Price	\$33.06	\$48.70	\$63.13	\$24.94	\$43.98	\$55.33

EV / EBITDA

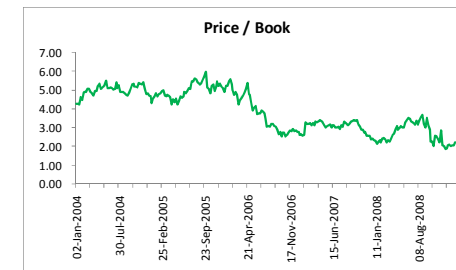
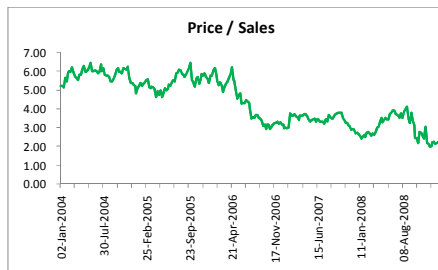
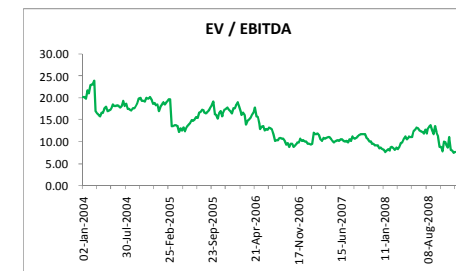
EV / EBITDA	LTM			NTM		
	Conservative	Base	Aggressive	Conservative	Base	Aggressive
7.8x						
LTM EBITDA	\$106.16	\$106.16	\$106.16	\$92.00	\$107.90	\$109.80
Projected Multiple	7.4x	10.2x	10.3x	7.4x	10.2x	10.3x
Implied EV	\$785.60	\$1,093.67	\$1,093.47	\$680.90	\$1,097.34	\$1,130.94
Debt	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Cash	\$31.90	\$31.90	\$31.90	\$31.90	\$31.90	\$31.90
Implied Equity Value	\$817.50	\$1,111.57	\$1,125.37	\$712.70	\$1,129.24	\$1,162.84
Shares Outstanding	24.5	24.5	24.5	23.4	23.4	23.4
Implied Share Price	\$33.42	\$45.44	\$46.01	\$30.46	\$48.26	\$49.69

Price / Book

Price / Book	LTM			NTM		
	Conservative	Base	Aggressive	Conservative	Base	Aggressive
2.0x						
Book Value Per Share	\$17.29	\$17.29	\$17.29	\$20.46	\$20.46	\$20.46
Projected Multiple	1.9x	2.8x	2.9x	1.9x	2.8x	2.9x
Implied Share Price	\$32.34	\$47.55	\$50.32	\$38.25	\$56.25	\$59.53

Price / Sales

Price / Sales	LTM			NTM		
	Conservative	Base	Aggressive	Conservative	Base	Aggressive
2.1x						
Revenue Per Share	\$16.30	\$16.30	\$16.30	\$17.77	\$17.77	\$17.77
Projected Multiple	2.0x	3.0x	3.2x	2.0x	3.0x	3.2x
Implied Share Price	\$32.44	\$48.91	\$52.00	\$35.35	\$53.30	\$56.67



Source: FactSet

Appendix 20: Beta Analysis

Year	Beta (Weekly vs. S&P 500)	Note
2004	0.92	
2005	1.77	Conservative Beta
2006	1.09	
2007	0.65	Aggressive Beta
2008-2009	1.33	Base Case Beta
Cumulative Beta	1.19	

Source: Returns data taken from Bloomberg

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