

Economic Analysis of Vertical Integration

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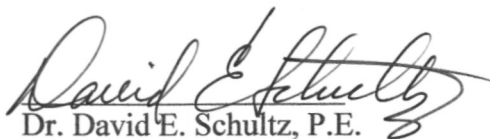
Carbolite Foods Incorporated

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Submitted to the Graduate Faculty
in partial fulfillment of the requirements
of the degree of
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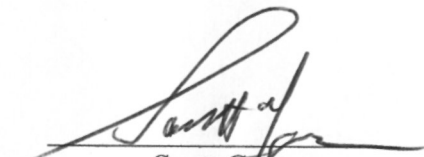
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Abstract

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This paper explores the economic considerations for vertical integration for Carbolite Foods Incorporated with Tsudis Chocolate Company, Incorporated. The central issues analyzed are whether risk reduction, value addition and other benefits of vertical integration warrant the cost of purchasing Tsudis Chocolate Company. The paper utilizes the Net Present Value approach to determine the economics of purchasing Tsudis Chocolate Company. The purchase price is compared to the current cost of purchasing manufactured goods from contract operation facilities. A wide variety of Carbolite and externally manufactured item volumes are compared in the analysis. Future product growth areas are considered. A final recommendation, time line and follow-up plan are also outlined.

Acknowledgement

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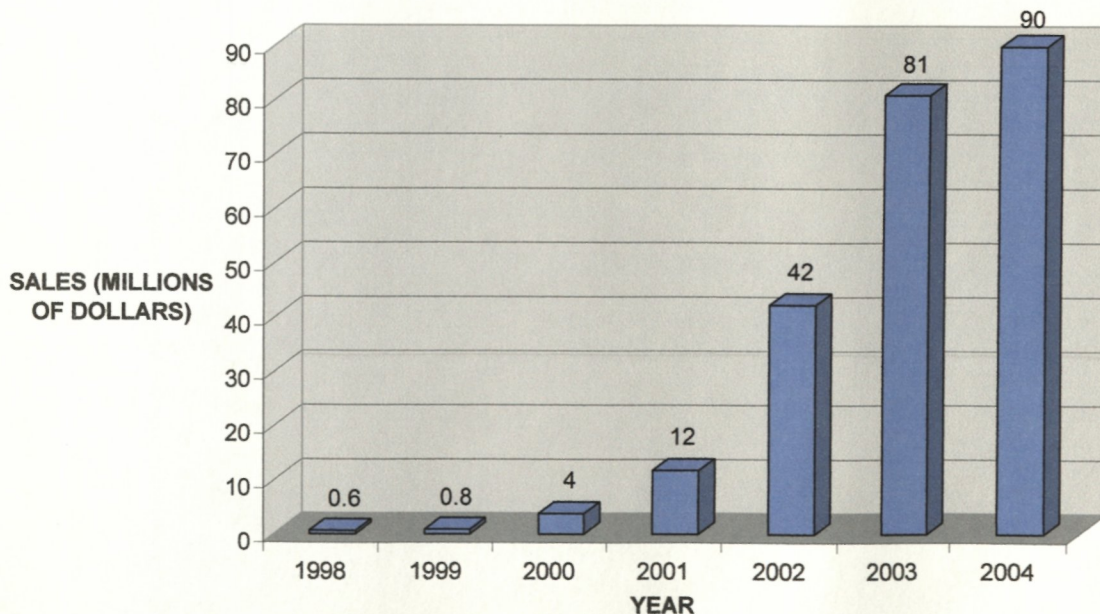
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I. Background

Carbolite Foods is a twelve year old corporation located in Evansville Indiana. It sells and markets sugar free and reduced carbohydrate food products for diabetics and those who follow the Atkins diet. Its primary products are chocolate bar and snack items which contain sugar substitutes for sweeteners. Carbolite Foods started as a partnership between Evansville native Jeff Greder and Gerry Morrison. These entrepreneurs first marketed low carbohydrate soft serve ice cream and shake mixes, often through health food outlets. Later, they expanded their product line to include bread mixes and baked good items. Annual sales first exceeded 1million dollars in 2000. Sales in 2003 exceeded 81 million dollars (Lish, 2004). A summary of Carbolite sales is illustrated below:

CARBOLITE ANNUAL SALES TRENDS (SOURCE: LISH, 2004)

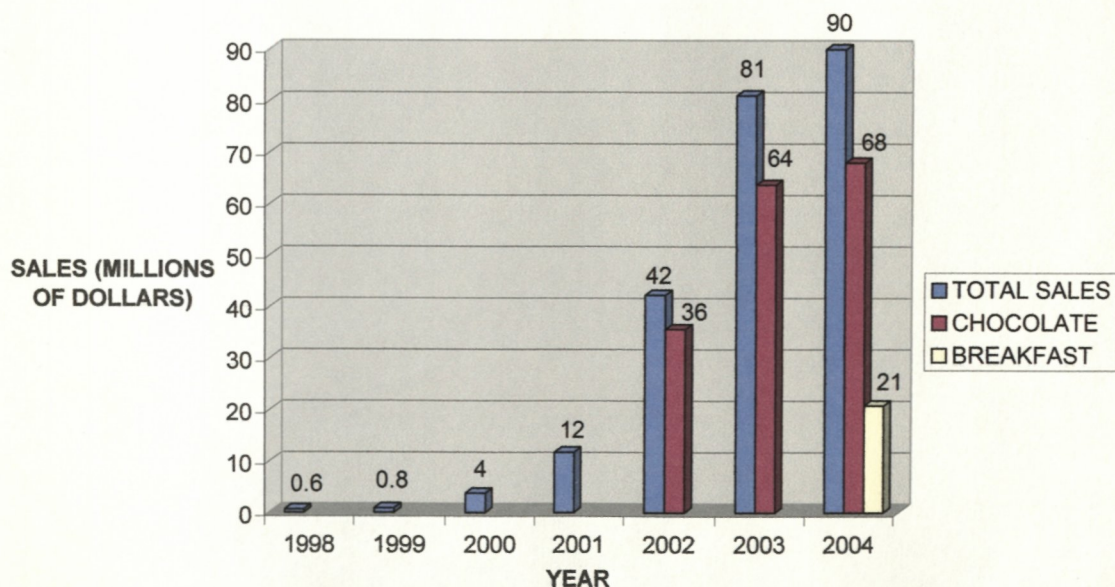


Major distributors for Carbolite products include Walmart, CVS, Walgreens and Target.

An extensive system of brokers is utilized to promote Carbolite product sales.

One of the key reasons for Carbolite's exponential growth lies with the company's decision to focus on "sweet indulgence" snack items in 2000. These items specifically included chocolate and candy items. Carbolite leadership recognized that chocolate was traditionally a "taboo" item for dieters. As one of the first companies to market a low carbohydrate chocolate product that tasted good, they developed a critical advantage over competitors. Carbolite had no confection manufacturing facility of its own. Therefore, all of the confectionary items would have to be co-packed through confection manufacturing operations throughout the U.S. Carbolite did not have a problem finding co-packers to help. The graph below illustrates the importance of confection items to overall Carbolite sales:

CARBOLITE SALES BY PRODUCT CATEGORY (SOURCE: LISH 2004)



Confection manufacturing in the USA has evolved from a large number of family operated businesses to an industry dominated by three worldwide giants (Hershey Foods, Mars and Nestle). There are still, however, a large number of independent manufacturers that sell less than \$500M annually. Carbolite currently utilizes ten co-packers to make over 80 different items. As sales approach \$100M dollars, Carbolite Foods is at a critical crossroads in its growth. Carbolite is currently paying ten external manufacturers a total of 40 million dollars annually for its products. Vertical integration would ensure ownership and control on Carbolite's branded products and eliminate the middlemen profits to contract operators. Vertical integration is also expected to add value to the net worth of the corporation. However, manufacturing operational overhead, future capital investment in equipment, and manufacturing management represent unexplored territory for Carbolite. Its brief experimentation with vertical integration for dry powder packaging was not successful (the process was subcontracted to Century Foods in April, 2004).

The financial analysis for a vertical integration decision must weigh the risk of investing in a particular brand area for Carbolite vs. the risk of not having direct control of its suppliers. Also in consideration are the limited product lines that will be singled out with vertical integration in confection production. The company is planning introductions of sweet snacks and salty snack items, neither of which could be produced in a confection facility.

II. Study of Vertical Integration

The advantages of vertical integration have long been known. When industries developed in the 1800's, many achieved high levels of vertical integration for cost reduction and economies of scale (Mpoyi, 2004). Perhaps the most famous example of vertical integration in manufacturing was led by Henry Ford in the automobile industry (Langlois, 1989). Ford controlled all raw materials going in to a Model T car. From rubber base for tires, iron ore for steel, glass making for windshields and headlights, every step of the automobile production process was controlled.

The main advantage of vertical integration is reduction of risk while adding value to the company (Malburg, 2000). Other advantages of vertical integration include better coordination among components, savings in joint production, quicker information flow, assurance of markets for components and easy vertical expansion into new components (Economides, 1998). Vertical integration may also bring benefits to the end customer. Shipping and turnaround times are generally reduced (Kline, 2001). Companies that are not vertically integrated and that are not cost-competitive may be overtaken by more efficient competitors or even by their suppliers (Bruck, 1995). Even so, vertical integration tends to be costly and risky, and management's decisions to vertically integrate have often been unsuccessful (Stuckey, 1993). In fact, many industries that have long been known for vertical integration have disintegrated in recent years. Ford and other manufacturers have sold off parts subsidiaries in an attempt to cut costs and increase flexibility (Bullington, 2002). Levels of vertical integration tend to run in

cycles, with higher integration occurring when cost reduction and service are emphasized, and lower integration occurring when flexibility and innovation are favored (Carbone, 2001). The type of vertical integration that will be explored in this analysis is known as vertical backward integration (Levenstein, 2002). This type of integration combines manufacturing of a product back to the raw material stage. In order to determine if vertical integration is right for Carbolite Foods, it is first necessary to review the history of the manufacturing facility which is targeted as a vertical integration candidate.

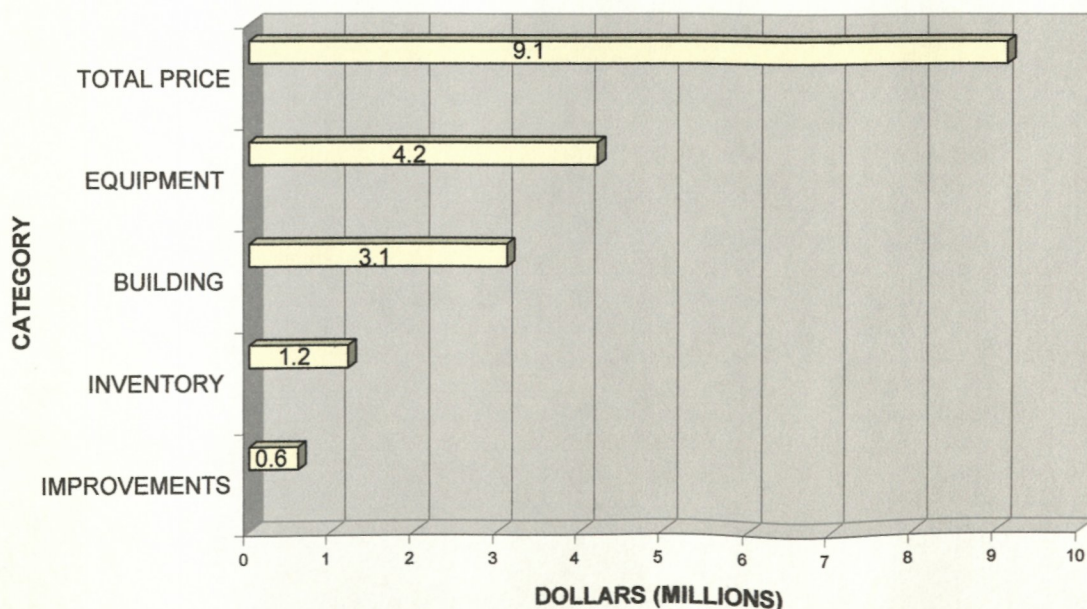
III. Tsudis Chocolate Company

The vertical integration analysis will focus on the purchase of one of Carbolite's current contract manufacturing companies, Tsudis Chocolate. Tsudis Chocolate is a 2 year old corporation located in Pittsburgh, Pennsylvania and is owned and operated by Pete Tsudis. Pete Tsudis began manufacturing candy as a partner with his father, "Speed" Tsudis and his brother, George Tsudis five years ago. Their original facility was known as Pennhurst manufacturing and is located in Pittsburgh. The Pennhurst plant produced chocolate bars for fundraising sales. The growing demand for low carbohydrate chocolate bars led to the production of sugar free chocolate. Pete Tsudis decided to expand to his own business of producing low carb chocolate bars in 2002. Pete reached an agreement with Gorant Candies of Youngstown Ohio, to install two low carb chocolate production lines and lease a portion of the Gorant facility. Pete is now in the process of moving equipment from Youngstown and Pennhurst to the former Clark Bar production facility in Pittsburgh. Pete will be combining the equipment from Pennhurst

manufacturing and the two lines from Gorant candies in the Clark facility. He will also be partnering with his father and brother in this common facility (Tsudis, 2004).

The plant itself is a 100,000 square foot facility and was built in 1975. It is a single story plant constructed of brick and concrete blocks. It is currently leased at the rate of \$2.00 per square foot and can be purchased for \$3.1 million. Approximately \$600,000 of improvements have been made to the building in 2004 to make it operational. The plant will have 5 operational lines, including bar molding lines, a granola line, enrobing lines, and “one shot” lines for peanut butter cups and small runs of molded items. The plant will employ approximately 50 people and will have the capacity to produce 250 million chocolate and granola bars annually. Tsudis has set the asking price at \$9.1 million dollars. A breakdown of the asking price is graphically illustrated:

PURCHASE PRICE FOR TSUDIS CHOCOLATE (SOURCE: TSUDIS, 2004)



IV. Tsudis Chocolate Company Operational Costs

A breakdown of Tsudis Chocolate company operational costs is listed in Table 1 (pages 23 and 24). Annual cost to produce to produce 30 million Carbolite bars is projected at \$7,404, 600. Cost categories include direct labor, indirect labor, raw materials, packaging, sanitation, mechanic work, Q.C. testing and pest control, building overhead and equipment investments. Of these categories, the highest costs are concentrated in raw materials, packaging and building overhead. In order to assess the risk that these costs present to future profitability, a Cost Sensitivity Analysis was performed on the data. Table 2 (pages 25 and 26) breaks down Tsudis operational cost categories and substitutes cost changes from -20% to +20%. This is an attempt to show how sensitive profit is to variations in cost categories within a 20% positive or negative range. The overall profit % is recalculated for each cost variable. The data clearly shows that profit is very sensitive to changes in raw material and packaging prices and less sensitive to changes in direct labor, indirect labor and equipment. For example, a 20% increase in raw materials would decrease overall profit from 9% to 2%, but a 20% increase in equipment would only drop the overall profit from 9% to 7%. What the data suggests is that pricing contracts for raw material and packaging pricing should be in place before manufacturing occurs. This will help minimize the downside risk if price increases occur. By the same token, larger profits can be gained if price decreases in raw materials and packaging are realized. Pricing contracts should not be locked in for extended terms if this would limit opportunities to negotiate for lower prices.

V. Calculation of Net Present Value

In order to determine if this is a fair representation of the worth of Tsudis Chocolate, the Net Present Value (NPV) approach will be utilized. The Internal Rate of Return (IRR) will also be calculated and compared to the Net Present Value (Ross, 2002).

Cash flows estimates for operational, equipment and building financing were made on the following set of assumptions:

- The cost of the building, improvements and equipment will be financed (7.9 million dollars)
- The 3.7 million dollar building and improvement cost will be financed for 15 years at 6.5% (2% above current prime rate).
- The 4.2 million dollar equipment cost will be financed for 5 years at 6.5% (2% above current prime rate).
- The present value factor (Ross, 2002, page 898) chosen was 7% for 15 years.
- Internal Rates of Return (IRR) above 7% are considered financially desirable for the project, as these values would exceed the acceptable level of return set by the company.
- Net profit per bar is 9% (See Table 1). Note that for the purpose of this project, profit is estimated from a cost basis. Net profit is often calculated from a cash flow analysis, factoring in total revenue streams and total costs (including marketing costs, taxes, payments to stockholders, etc.).

- Cash flows are calculated at the current negotiated rate of \$.27 per bar for Carbolite product and \$.30 per bar for externally manufactured products. The cash flow equation is: number of bars produced x bar cost x .09 net profit per bar.
- The total capacity of the plant is 250 million bars annually.

Based on these assumptions, an Excel spread sheet was developed to compare net present values with various levels of production of Carbolite and externally manufactured bars. Ideally, a positive net present value would be calculated using current base sales levels. A positive net present value indicates that the decision to vertically integrate is economically feasible. An IRR value above 7% (the current acceptable rate of return set by the company) would also be a positive financial indicator for vertical integration. If current production levels result in a positive net present value and an IRR value above 7%, then any future increases in Carbolite sales and the addition of external manufacturing volumes would further improve the financial decision to vertically integrate.

The first calculations utilize the current level of Carbolite production at 30 million bars. Table 3 (page 27) calculates the operational cash flow at 30 million bars as \$729,000. Using this cash flow estimate, the net present value is calculated in Table 4 (page 28) as -\$7,933,513 and the internal rate of return is -8.25%. Clearly, this indicates that vertical integration at this volume is not financially feasible. In other words, a positive net present value is only achieved when less than \$9,100,000 – \$7,933,513 is paid, or less than \$1,166,487.

Because Tsudis Chocolate was not interested in negotiating a lower purchase price, additional calculations were performed to see how net present value and internal rates of

return may change with future increased volumes. Production volumes of 45 million bars (Tables 5 and 6), 60 million bars (Tables 7 and 8) and 75 million bars (Tables 9 and 10) were analyzed. The four net present values were plotted with increasing volumes (Chart 4, page 35). The results show that a positive net present value is not achieved until volume surpasses 66 million bars. The purchase price of Tsudis Chocolate would be economically feasible if Carbolite bar production were 66 million bars or greater.

Since the 30 million bar level is a fraction of the 250 million bar Tsudis capacity, another consideration in the net present value analysis is producing product for external customers. Currently, Tsudis is producing 15 million bars for fundraising customers. These bars are priced at \$.30 each, 3 cents above the Carbolite preferred customer price of \$.27. Tables 12 through 17 calculate net present value with external manufacturing at 15 million bars and with Carbolite production at 30, 45 and 60 million bars. Chart 5 (page 42) shows the graph of the results of these analyses. Net present value becomes positive when 15 million externally manufactured bars are produced and more than 49 million Carbolite bars are produced.

A final set of calculations was made by holding Carbolite bar production steady at 30 million bars and increasing externally manufactured levels at 20 million bars (Tables 18 and 19), 30 million bars (Tables 20 and 21), 45 million bars (Tables 22 and 23), and 60 million bars (Tables 24 and 25). The results are graphed on Chart 6 (page 51). A positive net present value is achieved when externally manufactured bars exceed 32 million units.

VI. Alternatives to Purchase of Tsudis

Carbolite also explored the option of setting up a manufacturing plant near its headquarters in Evansville. There are existing buildings and Greenfield locations that could accommodate the needs of the manufacturing plant, plus tax abatement programs and training allowances to help with the financial feasibility of operating in Evansville. This issue was extensively discussed with the Carbolite management staff. After careful consideration, this option was ruled out. Carbolite management determined that vertical integration into manufacturing is only feasible when “buying” an existing facility where manufacturing staffing is involved. No high volume confection manufacturing facility exists in Evansville. An earlier agreement with Libs Chocolate Company was terminated when Libs backed away from expanding production to a high volume basis. Carbolite management determined that the risk of entering manufacturing “from the ground up” in Evansville was too great.

Another alternative is to buy several production lines and lease the building from Tsudis rather than purchase. Net present value and IRR were calculated on the following parameters proposed by Tsudis:

- The building can be leased for 15 years for \$20,000. Five percent annual lease increases are factored in during the period.
- The three million dollar equipment purchase will be financed for 5 years at 6.5%.
- The operational costs in Table 1 will be used for 30,000,000 Carbolite Bars.

The results of this analysis are summarized in Table 25 (page 52). A positive NPV value of \$954,627.62 and a positive IRR value of 10.41% is obtained. Based on these values, the project can be accepted. It should be noted that the three lines represent three fifths (150 million bars) of the 250 million bar Tsudis production capacity. The calculations are based on just 30 million Carbolite bars produced (the present need). Tsudis will be able to produce up to 100 million bars on the remaining two lines. Additional operational costs (such as direct and indirect labor, utilities, raw materials and packaging) will be absorbed by Tsudis.

VII. Discussion

The purchase of Tsudis is economically feasible if Carbolite bar volumes exceed 65 million. The purchase of Tsudis is also feasible if 15 million externally manufactured bars are produced and 48 million or more Carbolite bars are produced, or if 30 million Carbolite bars are produced and more than 32 million externally manufactured bars are produced. The latter statements involve a much higher degree of financial risk, as there is no guarantee that the external manufacturing bar volume would be at these ranges or that Carbolite's bar sales will continue to increase from current levels. The break even point for entering a positive net present value range is somewhere in the area of 65 million bars of total production. Even at this level, only 26% of the total Tsudis production capacity is utilized. Another consideration to the 9.1 million dollar purchase price is efficient utilization of capital. Should Carbolite tie up this amount of capital in manufacturing of confection products alone, or would it be more efficient to spend this money on sales and

advertising of current products and upcoming product introductions? There is strong historic evidence from the automobile industry that entrepreneurs starting new companies that directly invested in manufacturing failed (Dolan, 2001).

The purchase of three production lines, combined with a building lease arrangement, has financial merit based on the current production needs. Only one third of the money for an outright purchase is needed, and three lines still provide ample capacity for future production expansion. The negatives to this plan include a lack of total control over the production facility and no potential buildup of real estate value. It is, however, a viable financial approach vs. a direct purchase at this time.

VIII. Recommendations and Timeline

An outright purchase of Tsudis Chocolate Company is not recommended. The purchase of three production lines and lease of the facility is a financially sound alternative.

However, before doing this, Carbolite must consider chocolate bar sales trends and evaluate them as to their overall importance to Carbolite sales. Carbolite has already introduced non-chocolate breakfast items in early 2004. Introductions of sweet bakery snacks and salty snacks are planned in late 2004. If successful, these items will diminish the importance of confection item sales. The purchase of the Tsudis facility would not allow the flexibility of producing bakery and salty snack items. During the upcoming year, a benchmark study may be conducted with Carbolite's competitors (Atkins and

Keto) to determine if vertical integration will strengthen Carbolite's position against these organizations. Atkins and Keto are not vertically integrated at this time.

IX. Conclusions

Studies of the effects of vertical integration are disjointed (McAfee, 2004). They do not consistently prove the benefits of vertical integration. This vertical integration study shows that the purchase of Tsudis Chocolate based on the production of 30 million Carbolite bars is not economically feasible. This is proven by the negative net present value and negative internal rate of return for this production level. Positive net present values can be obtained if overall production of Carbolite and externally manufactured bars exceed 65 million units. This volume, however, carries heavy risks and assumptions from the current Carbolite 30 million bar production level. A more financially sound approach is to purchase three production lines from Tsudis and lease the building. This does not come with some of the full benefits of vertical integration, such as complete control of the manufacturing facility and equity gain in real estate.

Should vertical integration take place if a reliable vendor can manufacture the product with less risk, lower overall costs and better cash flow (Muldoon, 2003)? The answer at this time is no, but good business practice calls for periodic reviews of the economics of vertical integration (Panchak, 2003). Before making a decision to enter a lease arrangement with Tsudis, it must first determine if confection products will remain central to its sales base. A benchmarking study with Carbolite's competitors (Atkins and Keto) is recommended before making this decision.

TABLE 1

TSUDIS OPERATIONAL COSTS	
Direct Labor	
- 20 employees to produce 30,000,000 bars @ \$13.50 per hour (with benefits): 1 shift. 10% overtime premium added	\$ 617,760.00
Raw Materials	
- \$.0926 per bar, 30,000,000 bars	\$ 2,778,840.00
Packaging	
- \$.054 per bar, 30,000,000 bars	\$ 1,620,000.00
Indirect Labor	
-Production Supervisor	\$ 60,000.00
-QC manager	\$ 50,000.00
-QC support	\$ 112,000.00
-Warehouse supervisor (2)	\$ 64,000.00
-Shipping clerk	\$ 28,000.00
Sanitation	
-Sanitation Supervisor	\$ 40,000.00
-Sanitation Personnel	\$ 120,000.00
Mechanic	
-Facility mechanic	\$ 55,000.00
-Equipment/Shift Mechanics	\$ 160,000.00
Total Indirect Costs	\$ 689,000.00
QC/Micro Testing/Pest Control	
-Microbac laboratories (micro testing)	\$ 18,000.00
-Insects ltd. (Insect Professional - IMM)	\$ 7,000.00
-Becker Pest Control (bi-weekly pest service)	\$ 18,000.00
-AIB semi-annual plant audits	\$ 8,000.00
Total Pest/QC	\$ 51,000.00
Building Overhead	
-Utilities	\$ 350,000.00
-Taxes	\$ 90,000.00
-Insurance	\$ 30,000.00
-Snow removal/Lawn care	\$ 18,000.00
-Rent	\$ 250,000.00
-Building Repairs	\$ 150,000.00
Total Building Overhead Costs	\$ 888,000.00

Tsudis Operational Costs (cont.)

Equipment Investments			
-Equipment Repairs/Parts			\$ 155,000.00
-Equipment Amortization			\$ 350,000.00
-New Equipment Investments			\$ 255,000.00
Total Equipment Investments			\$ 760,000.00
TOTAL ALL COSTS:			\$ 7,404,600.00
BAR PRODUCTION:	COST	PROFIT	% PROFIT*
30,000,000	0.24682	0.02318	9%

*For the purpose of this project, profit is estimated from a cost basis.

Table 2

COST SENSITIVITY ANALYSIS**BAR PRODUCTION:**

30,000,000 carbolite bars annually

Direct Labor	COST CHANGE	NEW COST	COST PER BAR	PROFIT PER BAR	% PROFIT
\$ 617,760.00					
	-20%	\$ 494,208.00	0.242702	.027298	10%
	-10%	\$ 555,984.00	0.244761	.025239	9
	-5%	\$ 586,872.00	0.24579	.2421	9
	+5%	\$ 648,648.00	0.24785	.02215	8
	+10%	\$ 679,536.00	0.248879	.021121	8
	+20%	\$ 741,312.00	0.250938	.019062	7
Raw Materials	COST CHANGE	NEW COST	NEW PROFIT	PROFIT PER BAR	% PROFIT
\$ 2,778,840.00					
	-20%	\$ 2,223,072.00	0.228294	.041706	15%
	-10%	\$ 2,500,956.00	0.237557	.032443	12
	-5%	\$ 2,639,898.00	0.242189	0.027811	10
	+5%	\$ 2,917,782.00	0.251451	.018549	7
	+10%	\$ 3,056,724.00	0.256083	.013917	5
	+20%	\$ 3,334,608.00	0.265346	0.004654	2
Packaging	COST CHANGE	NEW COST	NEW PROFIT	PROFIT PER BAR	% PROFIT
\$ 1,620,000.00					
	-20%	\$ 1,296,000.00	0.23602	.03398	13%
	-10%	\$ 1,458,000.00	0.24142	.02858	11
	-5%	\$ 1,539,000.00	0.24412	.02588	10
	+5%	\$ 1,701,000.00	0.24952	.02048	8
	+10%	\$ 1,782,000.00	0.25222	.01778	7
	+20%	\$ 1,944,000.00	0.25762	.,01238	5
Indirect Labor	COST CHANGE	NEW COST	NEW PROFIT	PROFIT PER BAR	% PROFIT
\$ 689,000.00					
	-20%	\$ 551,200.00	0.242227	.027773	10%
	-10%	\$ 620,100.00	0.244523	.025477	9
	-5%	\$ 654,550.00	0.245672	.024328	9
	+5%	\$ 723,450.00	0.247968	.022032	8
	+10%	\$ 757,900.00	0.249117	.020883	8
	+20%	\$ 826,800.00	0.251413	.018587	7
QC/Pest Control	COST CHANGE	NEW COST	NEW PROFIT	PROFIT PER BAR	% PROFIT
\$ 51,000.00					
	-20%	\$ 40,800.00	0.24648	.02352	9%
	-10%	\$ 45,900.00	0.24665	0.02335	9
	-5%	\$ 48,450.00	0.246735	0.023265	9
	+5%	\$ 53,550.00	0.246905	.023095	8
	+10%	\$ 56,100.00	0.24699	.02301	8
	+20%	\$ 61,200.00	0.24716	.02284	8

COST SENSITIVITY ANALYSIS (continued)

Building Overhead	COST CHANGE	NEW COST	NEW PROFIT	PROFIT PER BAR	% PROFIT
\$ 888,000.00		\$ 710,400.00	0.2409	.0291	11%
	-20%	\$ 799,200.00	0.24386	.02614	10
	-10%	\$ 843,600.00	0.24534	.02466	9
	-5%	\$ 932,400.00	0.2483	.0217	8
	+5%	\$ 976,800.00	0.24978	.02022	7
	+10%	\$ 1,065,600.00	0.25274	.01726	6
	+20%				
Equipment Invest.	COST CHANGE	NEW COST	NEW PROFIT	PROFIT PER BAR	% PROFIT
\$ 760,000.00					
	-20%	\$ 608,000.00	0.241753	.028247	10%
	-10%	\$ 684,000.00	0.244278	0.025713	10
	-5%	\$ 722,000.00	0.245553	.02447	9
	+5%	\$ 798,000.00	0.248087	.021913	8
	+10%	\$ 836,000.00	0.249353	.020647	8
	+20%	\$ 912,000.00	0.251887	.018113	7

TABLE 3

OPERATIONAL CASH FLOW PROJECTIONS FOR TSUDIS CHOCOLATE

NET PROFIT MARGIN		BAR COST	BAR VOLUME	OPERATIONAL CASH FLOW
\$	-	\$ 0.30	0	\$ -
\$	0.03	\$ 0.30	0	\$ -
\$	0.06	\$ 0.30	0	\$ -
\$	0.09	\$ 0.30	0	\$ -
\$	0.12	\$ 0.30	0	\$ -
\$	-	\$ 0.27	30,000,000	\$ -
\$	0.03	\$ 0.27	30,000,000	\$ 243,000.00
\$	0.06	\$ 0.27	30,000,000	\$ 486,000.00
\$	0.09	\$ 0.27	30,000,000	\$ 729,000.00
\$	0.12	\$ 0.27	30,000,000	\$ 972,000.00
COMBINED CASH FLOW FOR TSUDIS CHOCOLATE:				\$ 729,000.00

SOURCE: TSUDIS, 2004; ROSS, 2002

TABLE 4

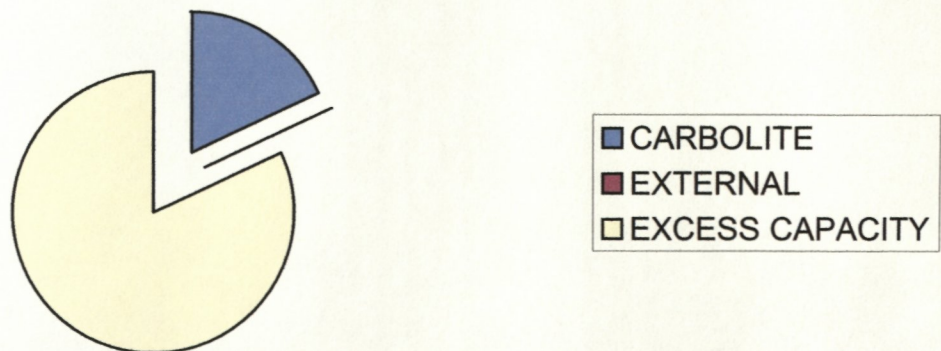
THE PRESENT VALUE OF TSUDIS CHOCOLATE COMPANY

END OF OPERATIONAL YEAR	CASH FLOW	5 YEAR EQUIPMENT	15 YEAR BUILDING	* NET CASH FLOW	PRESENT VALUE FACTOR 7%	PRESENT VAL NET CASH FL.
2005	\$ 729,000.00	\$734,767.63	\$150,708.95	\$ (156,476.58)	0.9346	\$ (146,243.01)
2006	\$ 729,000.00	\$783,976.37	\$147,000.35	\$ (201,976.72)	0.8734	\$ (176,406.47)
2007	\$ 729,000.00	\$836,480.72	\$171,571.48	\$ (279,052.20)	0.8163	\$ (227,790.31)
2008	\$ 729,000.00	\$892,501.40	\$183,061.93	\$ (346,563.33)	0.7629	\$ (264,393.16)
2009	\$ 729,000.00	\$951,831.12	\$195,321.91	\$ (418,153.03)	0.7113	\$ (298,143.11)
2010	\$ 729,000.00		\$208,402.99	\$ 520,597.01	0.6663	\$ 346,873.79
2011	\$ 729,000.00		\$222,360.13	\$ 506,639.87	0.6227	\$ 315,484.65
2012	\$ 729,000.00		\$237,252.02	\$ 491,747.98	0.582	\$ 286,197.32
2013	\$ 729,000.00		\$253,141.22	\$ 475,858.78	0.5439	\$ 258,819.59
2014	\$ 729,000.00		\$270,094.55	\$ 458,905.45	0.5083	\$ 233,261.64
2015	\$ 729,000.00		\$288,183.28	\$ 440,816.72	0.4751	\$ 209,432.02
2016	\$ 729,000.00		\$307,483.45	\$ 421,516.55	0.444	\$ 187,153.35
2017	\$ 729,000.00		\$328,076.20	\$ 400,923.80	0.415	\$ 166,383.38
2018	\$ 729,000.00		\$350,048.06	\$ 378,951.94	0.3878	\$ 146,957.56
2019	\$ 729,000.00		\$373,317.79	\$ 355,682.21	0.3624	\$ 128,899.23

Price of Firm	\$ (9,100,000.00)
Present Value of Firm	\$ 1,166,486.47
Present Value Factor	7%
Net Present Value of Firm	\$ (7,933,513.53)
IRR	-8.25%

CONCLUSION: REJECT PROPOSAL BASED ON NPV AND IRR

30 MILLION BARS FOR CARBOLITE
0 BARS FOR EXTERNAL MANUFACTURING

TSUDIS PRODUCTION CAPACITY

SOURCE: TSUDIS, 2004; ROSS, 2002

TABLE 5

OPERATIONAL CASH FLOW PROJECTIONS FOR TSUDIS CHOCOLATE

NET PROFIT MARGIN		BAR COST	BAR VOLUME	OPERATIONAL CASH FLOW
\$	-	\$ 0.30	0	\$ -
\$	0.03	\$ 0.30	0	\$ -
\$	0.06	\$ 0.30	0	\$ -
\$	0.09	\$ 0.30	0	\$ -
\$	0.12	\$ 0.30	0	\$ -
\$	-	\$ 0.27	45,000,000	\$ -
\$	0.03	\$ 0.27	45,000,000	\$ 364,500.00
\$	0.06	\$ 0.27	45,000,000	\$ 729,000.00
\$	0.09	\$ 0.27	45,000,000	\$ 1,093,500.00
\$	0.12	\$ 0.27	45,000,000	\$ 1,458,000.00
COMBINED CASH FLOW FOR TSUDIS CHOCOLATE:				\$ 1,093,500.00

SOURCE: TSUDIS, 2004; ROSS, 2002

TABLE 6

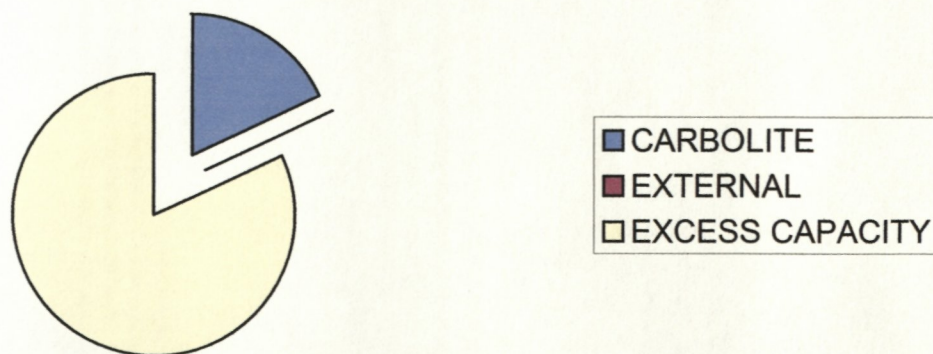
THE PRESENT VALUE OF TSUDIS CHOCOLATE COMPANY

END OF OPERATIONAL YEAR	CASH FLOW	5 YEAR EQUIPMENT	15 YEAR BUILDING	* NET CASH FLOW	PRESENT VALUE FACTOR 7%	PRESENT VAL NET CASH FL.
2005	\$ 1,093,500.00	\$734,767.63	\$150,708.95	\$ 208,023.42	0.9346	\$ 194,418.69
2006	\$ 1,093,500.00	\$783,976.37	\$147,000.35	\$ 162,523.28	0.8734	\$ 141,947.83
2007	\$ 1,093,500.00	\$836,480.72	\$171,571.48	\$ 85,447.80	0.8163	\$ 69,751.04
2008	\$ 1,093,500.00	\$892,501.40	\$183,061.93	\$ 17,936.67	0.7629	\$ 13,683.89
2009	\$ 1,093,500.00	\$951,831.12	\$195,321.91	\$ (53,653.03)	0.713	\$ (38,254.61)
2010	\$ 1,093,500.00		\$208,402.99	\$ 885,097.01	0.6663	\$ 589,740.14
2011	\$ 1,093,500.00		\$222,360.13	\$ 871,139.87	0.6227	\$ 542,458.80
2012	\$ 1,093,500.00		\$237,252.02	\$ 856,247.98	0.582	\$ 498,336.32
2013	\$ 1,093,500.00		\$253,141.22	\$ 840,358.78	0.5439	\$ 457,071.14
2014	\$ 1,093,500.00		\$270,094.55	\$ 823,405.45	0.5083	\$ 418,536.99
2015	\$ 1,093,500.00		\$288,183.28	\$ 805,316.72	0.4751	\$ 382,605.97
2016	\$ 1,093,500.00		\$307,483.45	\$ 786,016.55	0.444	\$ 348,991.35
2017	\$ 1,093,500.00		\$328,076.20	\$ 765,423.80	0.415	\$ 317,650.88
2018	\$ 1,093,500.00		\$350,048.06	\$ 743,451.94	0.3878	\$ 288,310.66
2019	\$ 1,093,500.00		\$373,317.79	\$ 720,182.21	0.3624	\$ 260,994.03

Price of Firm	\$ (9,100,000.00)
Present Value of Firm	\$ 4,486,243.12
Present Value Factor	7%
Net Present Value of Firm	\$ (4,613,756.88)
IRR	-0.67%

CONCLUSION: REJECT PROPOSAL BASED ON NPV AND IRR

45 MILLION BARS FOR CARBOLITE
0 BARS FOR EXTERNAL MANUFACTURING

TSUDIS PRODUCTION CAPACITY

SOURCE: TSUDIS, 2004; ROSS, 2002

TABLE 7

OPERATIONAL CASH FLOW PROJECTIONS FOR TSUDIS CHOCOLATE

	NET				OPERATIONAL
	PROFIT MARGIN	BAR COST	BAR VOLUME		CASH FLOW
\$	-	\$	0.30	0	\$ -
\$	0.03	\$	0.30	0	\$ -
\$	0.06	\$	0.30	0	\$ -
\$	0.09	\$	0.30	0	\$ -
\$	0.12	\$	0.30	0	\$ -
\$	-	\$	0.27	60,000,000	\$ -
\$	0.03	\$	0.27	60,000,000	\$ 486,000.00
\$	0.06	\$	0.27	60,000,000	\$ 972,000.00
\$	0.09	\$	0.27	60,000,000	\$ 1,458,000.00
\$	0.12	\$	0.27	60,000,000	\$ 1,944,000.00

COMBINED CASH FLOW FOR TSUDIS CHOCOLATE: \$ **1,458,000.00**

SOURCE: TSUDIS, 2004; ROSS, 2002

TABLE 8

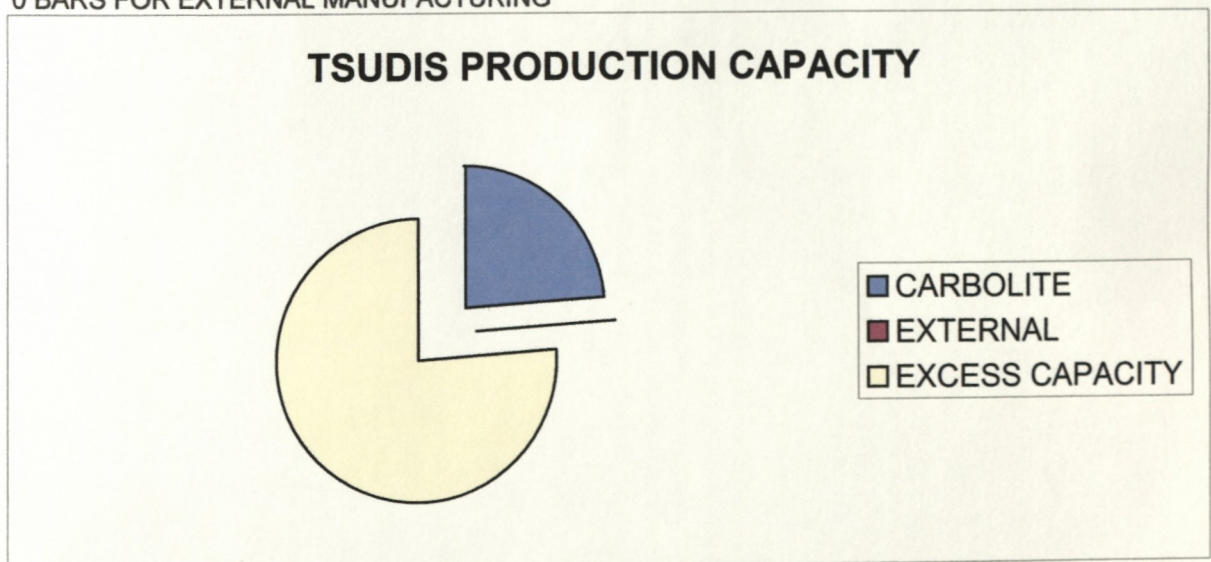
THE PRESENT VALUE OF TSUDIS CHOCOLATE COMPANY

END OF OPERATIONAL YEAR	OPERATIONAL CASH FLOW	5 YEAR EQUIPMENT	15 YEAR BUILDING	* NET CASH FLOW	PRESENT VALUE FACTOR 7%	PRESENT VAL NET CASH FL.
2005	\$ 1,458,000.00	\$ 734,767.63	\$ 150,708.95	\$ 572,523.42	0.9346	\$ 535,080.39
2006	\$ 1,458,000.00	\$ 783,976.37	\$ 147,000.35	\$ 527,023.28	0.8734	\$ 460,302.13
2007	\$ 1,458,000.00	\$ 836,480.72	\$ 171,571.48	\$ 449,947.80	0.8163	\$ 367,292.39
2008	\$ 1,458,000.00	\$ 892,501.40	\$ 183,061.93	\$ 382,436.67	0.7629	\$ 291,760.94
2009	\$ 1,458,000.00	\$ 951,831.12	\$ 195,321.91	\$ 310,846.97	0.713	\$ 221,633.89
2010	\$ 1,458,000.00		\$ 208,402.99	\$ 1,249,597.01	0.6663	\$ 832,606.49
2011	\$ 1,458,000.00		\$ 222,360.13	\$ 1,235,639.87	0.6227	\$ 769,432.95
2012	\$ 1,458,000.00		\$ 237,252.02	\$ 1,220,747.98	0.582	\$ 710,475.32
2013	\$ 1,458,000.00		\$ 253,141.22	\$ 1,204,858.78	0.5439	\$ 655,322.69
2014	\$ 1,458,000.00		\$ 270,094.55	\$ 1,187,905.45	0.5083	\$ 603,812.34
2015	\$ 1,458,000.00		\$ 288,183.28	\$ 1,169,816.72	0.4751	\$ 555,779.92
2016	\$ 1,458,000.00		\$ 307,483.45	\$ 1,150,516.55	0.444	\$ 510,829.35
2017	\$ 1,458,000.00		\$ 328,076.20	\$ 1,129,923.80	0.415	\$ 468,918.38
2018	\$ 1,458,000.00		\$ 350,048.06	\$ 1,107,951.94	0.3878	\$ 429,663.76
2019	\$ 1,458,000.00		\$ 373,317.79	\$ 1,084,682.21	0.3624	\$ 393,088.83

Price of Firm	\$ (9,100,000.00)
Present Value of Firm	\$ 7,805,999.77
Present Value Factor	7%
Net Present Value of Firm	\$ (1,294,000.23)
IRR	5.02%

CONCLUSION: REJECT PROPOSAL BASED ON NPV AND IRR

60 MILLION BARS FOR CARBOLITE
0 BARS FOR EXTERNAL MANUFACTURING



SOURCE: TSUDIS, 2004; ROSS, 2002

TABLE 9

OPERATIONAL CASH FLOW PROJECTIONS FOR TSUDIS CHOCOLATE

NET				OPERATIONAL	
PROFIT MARGIN	BAR COST	BAR VOLUME		CASH FLOW	
\$ -	\$ 0.30	0		\$ -	
\$ 0.03	\$ 0.30	0		\$ -	
\$ 0.06	\$ 0.30	0		\$ -	
\$ 0.09	\$ 0.30	0		\$ -	
\$ 0.12	\$ 0.30	0		\$ -	
\$ -	\$ 0.27	75,000,000		\$ -	
\$ 0.03	\$ 0.27	75,000,000		\$ 607,500.00	
\$ 0.06	\$ 0.27	75,000,000		\$ 1,215,000.00	
\$ 0.09	\$ 0.27	75,000,000		\$ 1,822,500.00	
\$ 0.12	\$ 0.27	75,000,000		\$ 2,430,000.00	

COMBINED CASH FLOW FOR TSUDIS CHOCOLATE: \$ **1,822,500.00**

SOURCE: TSUDIS, 2004; ROSS 2002

TABLE 10

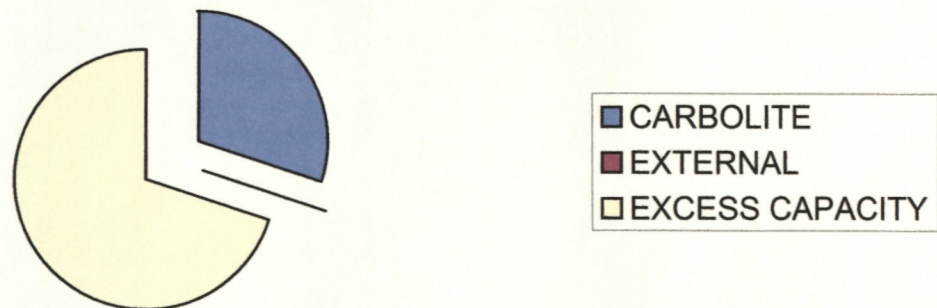
THE PRESENT VALUE OF TSUDIS CHOCOLATE COMPANY

END OF OPERATIONAL YEAR	OPERATIONAL CASH FLOW	5 YEAR EQUIPMENT	15 YEAR BUILDING	* NET CASH FLOW	PRESENT VALU FACTOR 7%	PRESENT VAL NET CASH FL.
2005	\$ 1,822,500.00	\$ 734,767.63	\$ 150,708.95	\$ 937,023.42	0.9346	\$ 875,742.09
2006	\$ 1,822,500.00	\$ 783,976.37	\$ 147,000.35	\$ 891,523.28	0.8734	\$ 778,656.43
2007	\$ 1,822,500.00	\$ 836,480.72	\$ 171,571.48	\$ 814,447.80	0.8163	\$ 664,833.74
2008	\$ 1,822,500.00	\$ 892,501.40	\$ 183,061.93	\$ 746,936.67	0.7629	\$ 569,837.99
2009	\$ 1,822,500.00	\$ 951,831.12	\$ 195,321.91	\$ 675,346.97	0.713	\$ 481,522.39
2010	\$ 1,822,500.00		\$ 208,402.99	\$ 1,614,097.01	0.6663	\$ 1,075,472.84
2011	\$ 1,822,500.00		\$ 222,360.13	\$ 1,600,139.87	0.6227	\$ 996,407.10
2012	\$ 1,822,500.00		\$ 237,252.02	\$ 1,585,247.98	0.582	\$ 922,614.32
2013	\$ 1,822,500.00		\$ 253,141.22	\$ 1,569,358.78	0.5439	\$ 853,574.24
2014	\$ 1,822,500.00		\$ 270,094.55	\$ 1,552,405.45	0.5083	\$ 789,087.69
2015	\$ 1,822,500.00		\$ 288,183.28	\$ 1,534,316.72	0.4751	\$ 728,953.87
2016	\$ 1,822,500.00		\$ 307,483.45	\$ 1,515,016.55	0.444	\$ 672,667.35
2017	\$ 1,822,500.00		\$ 328,076.20	\$ 1,494,423.80	0.415	\$ 620,185.88
2018	\$ 1,822,500.00		\$ 350,048.06	\$ 1,472,451.94	0.3878	\$ 571,016.86
2019	\$ 1,822,500.00		\$ 373,317.79	\$ 1,449,182.21	0.3624	\$ 525,183.63

Price of Firm	\$ (9,100,000.00)
Present Value of Firm	\$ 11,125,756.42
Present Value Factor	7%
Net Present Value of Firm	\$ 2,025,756.42
IRR	9.92%

CONCLUSION: ACCEPT PROPOSAL BASED ON NPV AND IRR

75 MILLION BARS FOR CARBOLITE
0 BARS FOR EXTERNAL MANUFACTURING

TSUDIS PRODUCTION CAPACITY

SOURCE: TSUDIS, 2004; ROSS, 2002

CHART 4

NET PRESENT VALUE FOR PRODUCTION OF 30 TO 75 MILLION
CARBOLITE BARS (EXTERNALLY MANUFACTURED BARS HELD AT
ZERO)

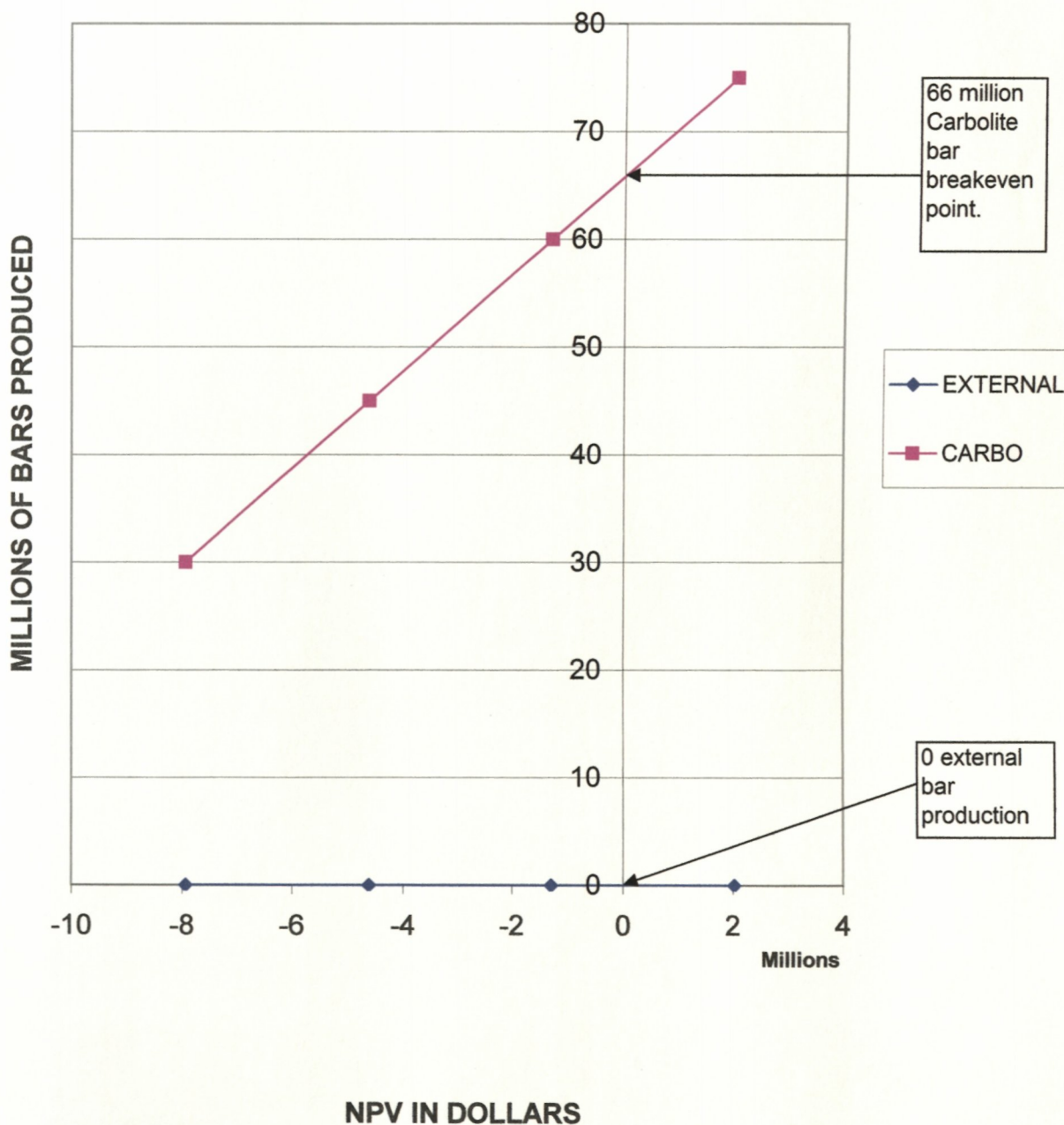


TABLE 11

OPERATIONAL CASH FLOW PROJECTIONS FOR TSUDIS CHOCOLATE

NET PROFIT MARGIN	BAR COST	BAR VOLUME	OPERATIONAL CASH FLOW
\$ -	\$ 0.30	15,000,000	\$ -
\$ 0.03	\$ 0.30	15,000,000	\$ 135,000.00
\$ 0.06	\$ 0.30	15,000,000	\$ 270,000.00
\$ 0.09	\$ 0.30	15,000,000	\$ 405,000.00
\$ 0.12	\$ 0.30	15,000,000	\$ 540,000.00
\$ -	\$ 0.27	30,000,000	\$ -
\$ 0.03	\$ 0.27	30,000,000	\$ 243,000.00
\$ 0.06	\$ 0.27	30,000,000	\$ 486,000.00
\$ 0.09	\$ 0.27	30,000,000	\$ 729,000.00
\$ 0.12	\$ 0.27	30,000,000	\$ 972,000.00
COMBINED CASH FLOW FOR TSUDIS CHOCOLATE:			\$ 1,134,000.00

SOURCE: TSUDIS, 2004; ROSS 2002

TABLE 12

THE PRESENT VALUE OF TSUDIS CHOCOLATE COMPANY

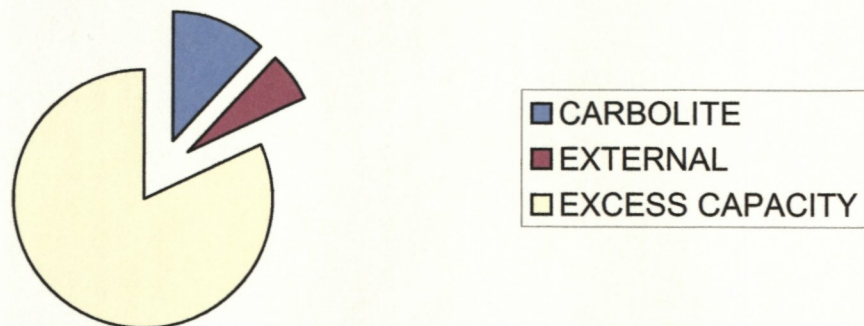
END OF OPERATIONAL YEAR	OPERATIONAL CASH FLOW	5 YEAR EQUIPMENT	15 YEAR BUILDING	* NET CASH FLOW	PRESENT VALUE FACTOR 7%	PRESENT VAL. NET CASH FL.
2005	\$ 1,134,000.00	\$ 734,767.63	\$ 150,708.95	\$ 248,523.42	0.9346	\$ 232,269.99
2006	\$ 1,134,000.00	\$ 783,976.37	\$ 147,000.35	\$ 203,023.28	0.8734	\$ 177,320.53
2007	\$ 1,134,000.00	\$ 836,480.72	\$ 171,571.48	\$ 125,947.80	0.8163	\$ 102,811.19
2008	\$ 1,134,000.00	\$ 892,501.40	\$ 183,061.93	\$ 58,436.67	0.7629	\$ 44,581.34
2009	\$ 1,134,000.00	\$ 951,831.12	\$ 195,321.91	\$ (13,153.03)	0.713	\$ (9,378.11)
2010	\$ 1,134,000.00		\$ 208,402.99	\$ 925,597.01	0.6663	\$ 616,725.29
2011	\$ 1,134,000.00		\$ 222,360.13	\$ 911,639.87	0.6227	\$ 567,678.15
2012	\$ 1,134,000.00		\$ 237,252.02	\$ 896,747.98	0.582	\$ 521,907.32
2013	\$ 1,134,000.00		\$ 253,141.22	\$ 880,858.78	0.5439	\$ 479,099.09
2014	\$ 1,134,000.00		\$ 270,094.55	\$ 863,905.45	0.5083	\$ 439,123.14
2015	\$ 1,134,000.00		\$ 288,183.28	\$ 845,816.72	0.4751	\$ 401,847.52
2016	\$ 1,134,000.00		\$ 307,483.45	\$ 826,516.55	0.444	\$ 366,973.35
2017	\$ 1,134,000.00		\$ 328,076.20	\$ 805,923.80	0.415	\$ 334,458.38
2018	\$ 1,134,000.00		\$ 350,048.06	\$ 783,951.94	0.3878	\$ 304,016.56
2019	\$ 1,134,000.00		\$ 373,317.79	\$ 760,682.21	0.3624	\$ 275,671.23

Price of Firm	\$ (9,100,000.00)
Present Value of Firm	\$ 4,855,104.97
Present Value Factor	7%
Net Present Value of Firm	\$ (4,244,895.03)
IRR	0.03%

CONCLUSION: REJECT PROPOSAL BASED ON NPV AND IRR

30 MILLION BARS FOR CARBOLITE

15 BARS FOR EXTERNAL MANUFACTURING

TSUDIS PRODUCTION CAPACITY

SOURCE: TSUDIS, 2004; ROSS, 2002

TABLE 13

OPERATIONAL CASH FLOW PROJECTIONS FOR TSUDIS CHOCOLATE

	NET				OPERATIONAL
	PROFIT MARGIN	BAR COST	BAR VOLUME		CASH FLOW
\$	-	\$	0.30	15,000,000	\$ -
\$	0.03	\$	0.30	15,000,000	\$ 135,000.00
\$	0.06	\$	0.30	15,000,000	\$ 270,000.00
\$	0.09	\$	0.30	15,000,000	\$ 405,000.00
\$	0.12	\$	0.30	15,000,000	\$ 540,000.00
\$	-	\$	0.27	45,000,000	\$ -
\$	0.03	\$	0.27	45,000,000	\$ 364,500.00
\$	0.06	\$	0.27	45,000,000	\$ 729,000.00
\$	0.09	\$	0.27	45,000,000	\$ 1,093,500.00
\$	0.12	\$	0.27	45,000,000	\$ 1,458,000.00
COMBINED CASH FLOW FOR TSUDIS CHOCOLATE:					\$ 1,498,500.00

SOURCE: TSUDIS, 2004; ROSS 2002

TABLE 14

THE PRESENT VALUE OF TSUDIS CHOCOLATE COMPANY

END OF OPERATIONAL YEAR	OPERATIONAL CASH FLOW	5 YEAR EQUIPMENT	15 YEAR BUILDING	* NET CASH FLOW	PRESENT VALUE FACTOR 7%	PRESENT VAL. NET CASH FL.
2005	\$ 1,498,500.00	\$ 734,767.63	\$150,708.95	\$ 613,023.42	0.9346	\$ 572,931.69
2006	\$ 1,498,500.00	\$ 783,976.37	\$147,000.35	\$ 567,523.28	0.8734	\$ 495,674.83
2007	\$ 1,498,500.00	\$ 836,480.72	\$171,571.48	\$ 490,447.80	0.8163	\$ 400,352.54
2008	\$ 1,498,500.00	\$ 892,501.40	\$183,061.93	\$ 422,936.67	0.7629	\$ 322,658.39
2009	\$ 1,498,500.00	\$ 951,831.12	\$195,321.91	\$ 351,346.97	0.713	\$ 250,510.39
2010	\$ 1,498,500.00		\$208,402.99	\$ 1,290,097.01	0.6663	\$ 859,591.64
2011	\$ 1,498,500.00		\$222,360.13	\$ 1,276,139.87	0.6227	\$ 794,652.30
2012	\$ 1,498,500.00		\$237,252.02	\$ 1,261,247.98	0.582	\$ 734,046.32
2013	\$ 1,498,500.00		\$253,141.22	\$ 1,245,358.78	0.5439	\$ 677,350.64
2014	\$ 1,498,500.00		\$270,094.55	\$ 1,228,405.45	0.5083	\$ 624,398.49
2015	\$ 1,498,500.00		\$288,183.28	\$ 1,210,316.72	0.4751	\$ 575,021.47
2016	\$ 1,498,500.00		\$307,483.45	\$ 1,191,016.55	0.444	\$ 528,811.35
2017	\$ 1,498,500.00		\$328,076.20	\$ 1,170,423.80	0.415	\$ 485,725.88
2018	\$ 1,498,500.00		\$350,048.06	\$ 1,148,451.94	0.3878	\$ 445,369.66
2019	\$ 1,498,500.00		\$373,317.79	\$ 1,125,182.21	0.3624	\$ 407,766.03

Price of Firm \$ (9,100,000.00)

Present Value of Firm \$ 8,174,861.62

Present Value Factor 7%

Net Present Value of Firm \$ (925,138.38)

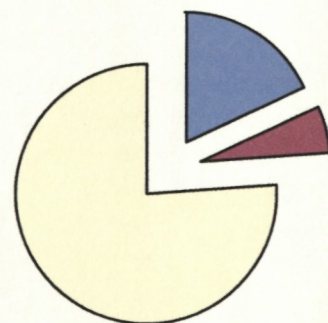
IRR 5.60%

CONCLUSION: REJECT PROPOSAL BASED ON NPV AND IRR

45 MILLION BARS FOR CARBOLITE

15 BARS FOR EXTERNAL MANUFACTURING

TSUDIS PRODUCTION CAPACITY



■ CARBOLITE
 ■ EXTERNAL
 □ EXCESS CAPACITY

SOURCE: TSUDIS, 2004; ROSS, 2002

TABLE 15

OPERATIONAL CASH FLOW PROJECTIONS FOR TSUDIS CHOCOLATE

NET		BAR COST	BAR VOLUME	OPERATIONAL	
PROFIT MARGIN				CASH FLOW	
\$	-	\$ 0.30	15,000,000	\$	-
\$	0.03	\$ 0.30	15,000,000	\$	135,000.00
\$	0.06	\$ 0.30	15,000,000	\$	270,000.00
\$	0.09	\$ 0.30	15,000,000	\$	405,000.00
\$	0.12	\$ 0.30	15,000,000	\$	540,000.00
\$	-	\$ 0.27	60,000,000	\$	-
\$	0.03	\$ 0.27	60,000,000	\$	486,000.00
\$	0.06	\$ 0.27	60,000,000	\$	972,000.00
\$	0.09	\$ 0.27	60,000,000	\$	1,458,000.00
\$	0.12	\$ 0.27	60,000,000	\$	1,944,000.00
COMBINED CASH FLOW FOR TSUDIS CHOCOLATE:				\$	1,863,000.00

SOURCE: TSUDIS, 2004; ROSS 2002

TABLE 16

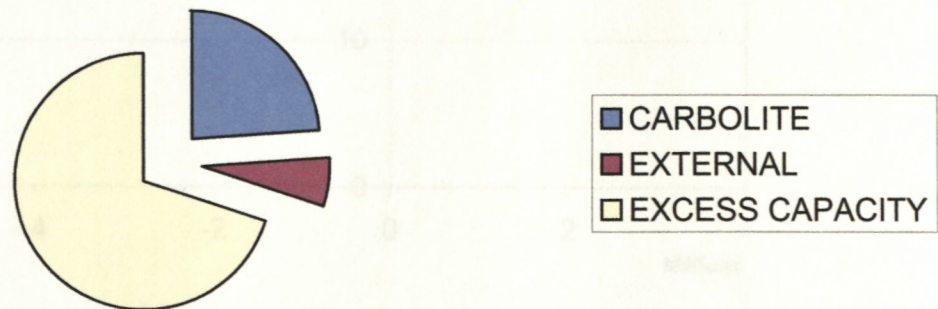
THE PRESENT VALUE OF TSUDIS CHOCOLATE COMPANY

END OF OPERATIONAL YEAR	CASH FLOW	5 YEAR EQUIPMENT	15 YEAR BUILDING	* NET CASH FLOW	PRESENT VALUE FACTOR 7%	PRESENT VAL. NET CASH FL.
				-9100000		
2005	\$ 1,863,000.00	\$ 734,767.63	\$150,708.95	\$ 977,523.42	0.9346	\$ 913,593.39
2006	\$ 1,863,000.00	\$ 783,976.37	\$147,000.35	\$ 932,023.28	0.8734	\$ 814,029.13
2007	\$ 1,863,000.00	\$ 836,480.72	\$171,571.48	\$ 854,947.80	0.8163	\$ 697,893.89
2008	\$ 1,863,000.00	\$ 892,501.40	\$183,061.93	\$ 787,436.67	0.7629	\$ 600,735.44
2009	\$ 1,863,000.00	\$ 951,831.12	\$195,321.91	\$ 715,846.97	0.713	\$ 510,398.89
2010	\$ 1,863,000.00		\$208,402.99	\$ 1,654,597.01	0.6663	\$ 1,102,457.99
2011	\$ 1,863,000.00		\$222,360.13	\$ 1,640,639.87	0.6227	\$ 1,021,626.45
2012	\$ 1,863,000.00		\$237,252.02	\$ 1,625,747.98	0.582	\$ 946,185.32
2013	\$ 1,863,000.00		\$253,141.22	\$ 1,609,858.78	0.5439	\$ 875,602.19
2014	\$ 1,863,000.00		\$270,094.55	\$ 1,592,905.45	0.5083	\$ 809,673.84
2015	\$ 1,863,000.00		\$288,183.28	\$ 1,574,816.72	0.4751	\$ 748,195.42
2016	\$ 1,863,000.00		\$307,483.45	\$ 1,555,516.55	0.444	\$ 690,649.35
2017	\$ 1,863,000.00		\$328,076.20	\$ 1,534,923.80	0.415	\$ 636,993.38
2018	\$ 1,863,000.00		\$350,048.06	\$ 1,512,951.94	0.3878	\$ 586,722.76
2019	\$ 1,863,000.00		\$373,317.79	\$ 1,489,682.21	0.3624	\$ 539,860.83

Price of Firm	\$ (9,100,000.00)
Present Value of Firm	\$ 11,494,618.27
Present Value Factor	7%
Net Present Value of Firm	\$ 2,394,618.27
IRR	10.44%

CONCLUSION:ACCEPT PROPOSAL BASED ON NPV AND IRR
60 MILLION BARS FOR CARBOLITE
15 BARS FOR EXTERNAL MANUFACTURING

TSUDIS PRODUCTION CAPACITY



SOURCE: TSUDIS, 2004; ROSS,2002

CHART 5

NET PRESENT VALUE FOR PRODUCTION OF 30 TO 60 MILLION CARBOLITE BARS (EXTERNALLY MANUFACTURED BARS HELD AT 15 MILLION)

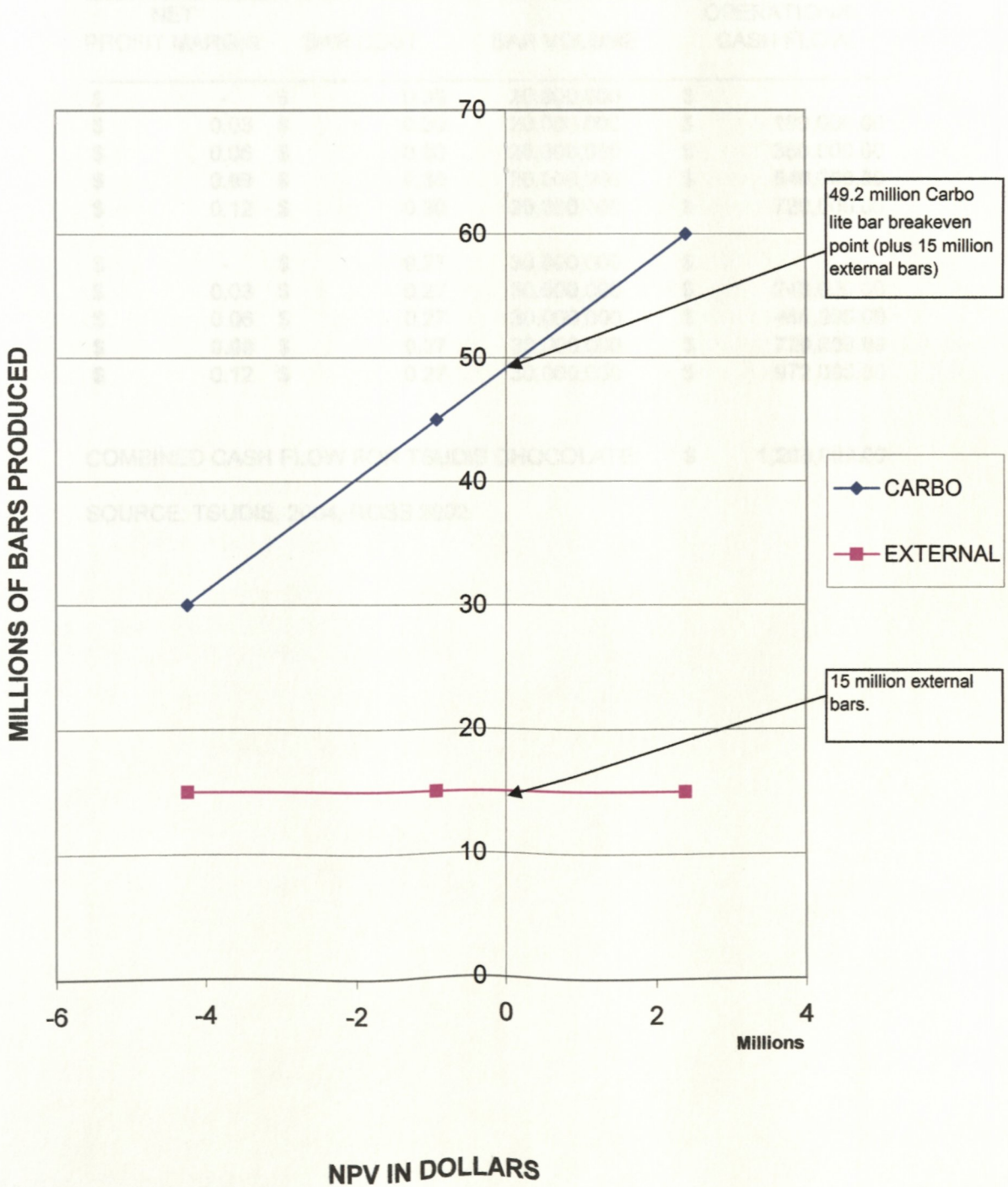


TABLE 17

OPERATIONAL CASH FLOW PROJECTIONS FOR TSUDIS CHOCOLATE

	NET				OPERATIONAL
	PROFIT MARGIN	BAR COST	BAR VOLUME		CASH FLOW
\$	-	\$ 0.30	20,000,000	\$	-
\$	0.03	\$ 0.30	20,000,000	\$	180,000.00
\$	0.06	\$ 0.30	20,000,000	\$	360,000.00
\$	0.09	\$ 0.30	20,000,000	\$	540,000.00
\$	0.12	\$ 0.30	20,000,000	\$	720,000.00
\$	-	\$ 0.27	30,000,000	\$	-
\$	0.03	\$ 0.27	30,000,000	\$	243,000.00
\$	0.06	\$ 0.27	30,000,000	\$	486,000.00
\$	0.09	\$ 0.27	30,000,000	\$	729,000.00
\$	0.12	\$ 0.27	30,000,000	\$	972,000.00
COMBINED CASH FLOW FOR TSUDIS CHOCOLATE:				\$	1,269,000.00

SOURCE: TSUDIS, 2004; ROSS 2002

TABLE 18

THE PRESENT VALUE OF TSUDIS CHOCOLATE COMPANY

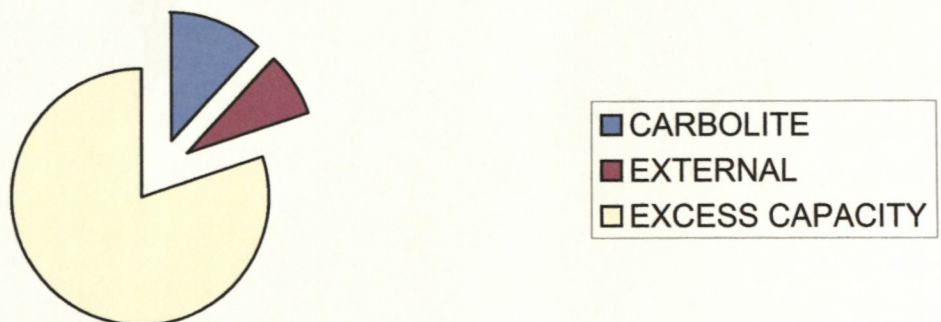
END OF OPERATIONAL YEAR	CASH FLOW	5 YEAR EQUIPMENT	15 YEAR BUILDING	* NET CASH FLOW	PRESENT VALUE FACTOR 7%	PRESENT VAL. NET CASH FL.
				-9100000		
2005	\$ 1,269,000.00	\$734,767.63	\$ 150,708.95	\$ 383,523.42	0.9346	\$ 358,440.99
2006	\$ 1,269,000.00	\$783,976.37	\$ 147,000.35	\$ 338,023.28	0.8734	\$ 295,229.53
2007	\$ 1,269,000.00	\$836,480.72	\$ 171,571.48	\$ 260,947.80	0.8163	\$ 213,011.69
2008	\$ 1,269,000.00	\$892,501.40	\$ 183,061.93	\$ 193,436.67	0.7629	\$ 147,572.84
2009	\$ 1,269,000.00	\$951,831.12	\$ 195,321.91	\$ 121,846.97	0.713	\$ 86,876.89
2010	\$ 1,269,000.00		\$ 208,402.99	\$ 1,060,597.01	0.6663	\$ 706,675.79
2011	\$ 1,269,000.00		\$ 222,360.13	\$ 1,046,639.87	0.6227	\$ 651,742.65
2012	\$ 1,269,000.00		\$ 237,252.02	\$ 1,031,747.98	0.582	\$ 600,477.32
2013	\$ 1,269,000.00		\$ 253,141.22	\$ 1,015,858.78	0.5439	\$ 552,525.59
2014	\$ 1,269,000.00		\$ 270,094.55	\$ 998,905.45	0.5083	\$ 507,743.64
2015	\$ 1,269,000.00		\$ 288,183.28	\$ 980,816.72	0.4751	\$ 465,986.02
2016	\$ 1,269,000.00		\$ 307,483.45	\$ 961,516.55	0.444	\$ 426,913.35
2017	\$ 1,269,000.00		\$ 328,076.20	\$ 940,923.80	0.415	\$ 390,483.38
2018	\$ 1,269,000.00		\$ 350,048.06	\$ 918,951.94	0.3878	\$ 356,369.56
2019	\$ 1,269,000.00		\$ 373,317.79	\$ 895,682.21	0.3624	\$ 324,595.23

Price of Firm	\$ (9,100,000.00)
Present Value of Firm	\$ 6,084,644.47
Present Value Factor	7%
Net Present Value of Firm	\$ (3,015,355.53)
IRR	2.21%

CONCLUSION; REJECT PROPOSAL BASED ON NPV AND IRR

30 MILLION BARS FOR CARBOLITE
20 BARS FOR EXTERNAL MANUFACTURING

TSUDIS PRODUCTION CAPACITY



SOURCE: TSUDIS, 2004; ROSS, 2002

TABLE 19

OPERATIONAL CASH FLOW PROJECTIONS FOR TSUDIS CHOCOLATE

NET				OPERATIONAL	
PROFIT MARGIN	BAR COST	BAR VOLUME		CASH FLOW	
\$ -	\$ 0.30	30,000,000	\$	-	
\$ 0.03	\$ 0.30	30,000,000	\$	270,000.00	
\$ 0.06	\$ 0.30	30,000,000	\$	540,000.00	
\$ 0.09	\$ 0.30	30,000,000	\$	810,000.00	
\$ 0.12	\$ 0.30	30,000,000	\$	1,080,000.00	
\$ -	\$ 0.27	30,000,000	\$	-	
\$ 0.03	\$ 0.27	30,000,000	\$	243,000.00	
\$ 0.06	\$ 0.27	30,000,000	\$	486,000.00	
\$ 0.09	\$ 0.27	30,000,000	\$	729,000.00	
\$ 0.12	\$ 0.27	30,000,000	\$	972,000.00	
COMBINED CASH FLOW FOR TSUDIS CHOCOLATE:				\$	1,539,000.00

SOURCE: TSUDIS, 2004; ROSS 2002

TABLE 20

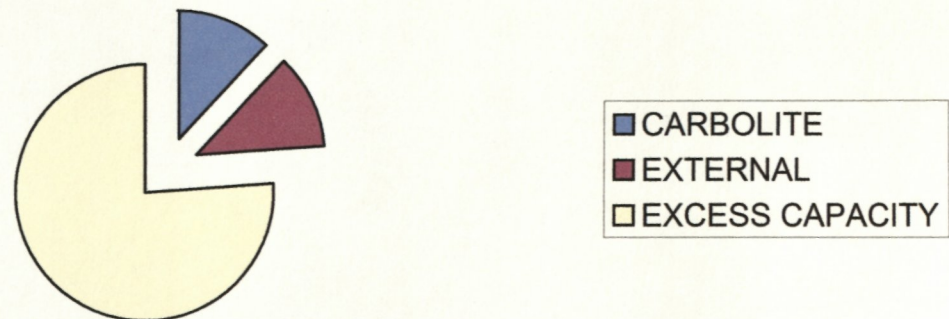
THE PRESENT VALUE OF TSUDIS CHOCOLATE COMPANY

END OF OPERATIONAL YEAR	OPERATIONAL CASH FLOW	5 YEAR EQUIPMENT	15 YEAR BUILDING	* NET CASH FLOW	PRESENT VALUE FACTOR 7%	PRESENT VAL NET CASH FL.
2005	\$ 1,539,000.00	\$ 734,767.63	\$ 150,708.95	\$ 653,523.42	0.9346	\$ 610,782.99
2006	\$ 1,539,000.00	\$ 783,976.37	\$ 147,000.35	\$ 608,023.28	0.8734	\$ 531,047.53
2007	\$ 1,539,000.00	\$ 836,480.72	\$ 171,571.48	\$ 530,947.80	0.8163	\$ 433,412.69
2008	\$ 1,539,000.00	\$ 892,501.40	\$ 183,061.93	\$ 463,436.67	0.7629	\$ 353,555.84
2009	\$ 1,539,000.00	\$ 951,831.12	\$ 195,321.91	\$ 391,846.97	0.713	\$ 279,386.89
2010	\$ 1,539,000.00		\$ 208,402.99	\$ 1,330,597.01	0.6663	\$ 886,576.79
2011	\$ 1,539,000.00		\$ 222,360.13	\$ 1,316,639.87	0.6227	\$ 819,871.65
2012	\$ 1,539,000.00		\$ 237,252.02	\$ 1,301,747.98	0.582	\$ 757,617.32
2013	\$ 1,539,000.00		\$ 253,141.22	\$ 1,285,858.78	0.5439	\$ 699,378.59
2014	\$ 1,539,000.00		\$ 270,094.55	\$ 1,268,905.45	0.5083	\$ 644,984.64
2015	\$ 1,539,000.00		\$ 288,183.28	\$ 1,250,816.72	0.4751	\$ 594,263.02
2016	\$ 1,539,000.00		\$ 307,483.45	\$ 1,231,516.55	0.444	\$ 546,793.35
2017	\$ 1,539,000.00		\$ 328,076.20	\$ 1,210,923.80	0.415	\$ 502,533.38
2018	\$ 1,539,000.00		\$ 350,048.06	\$ 1,188,951.94	0.3878	\$ 461,075.56
2019	\$ 1,539,000.00		\$ 373,317.79	\$ 1,165,682.21	0.3624	\$ 422,443.23

Price of Firm	\$ (9,100,000.00)
Present Value of Firm	\$ 8,543,723.47
Present Value Factor	7%
Net Present Value of Firm	\$ (556,276.53)
IRR	6.16%

CONCLUSION: REJECT PROPOSAL BASED ON NPV AND IRR
30 MILLION BARS FOR CARBOLITE
30 BARS FOR EXTERNAL MANUFACTURING

TSUDIS PRODUCTION CAPACITY



SOURCE: TSUDIS, 2004; ROSS, 2002

TABLE 21

OPERATIONAL CASH FLOW PROJECTIONS FOR TSUDIS CHOCOLATE

	NET				OPERATIONAL
	PROFIT MARGIN	BAR COST	BAR VOLUME		CASH FLOW
\$	-	\$ 0.30	45,000,000	\$	-
\$	0.03	\$ 0.30	45,000,000	\$	405,000.00
\$	0.06	\$ 0.30	45,000,000	\$	810,000.00
\$	0.09	\$ 0.30	45,000,000	\$	1,215,000.00
\$	0.12	\$ 0.30	45,000,000	\$	1,620,000.00
\$	-	\$ 0.27	30,000,000	\$	-
\$	0.03	\$ 0.27	30,000,000	\$	243,000.00
\$	0.06	\$ 0.27	30,000,000	\$	486,000.00
\$	0.09	\$ 0.27	30,000,000	\$	729,000.00
\$	0.12	\$ 0.27	30,000,000	\$	972,000.00
COMBINED CASH FLOW FOR TSUDIS CHOCOLATE:					\$ 1,944,000.00

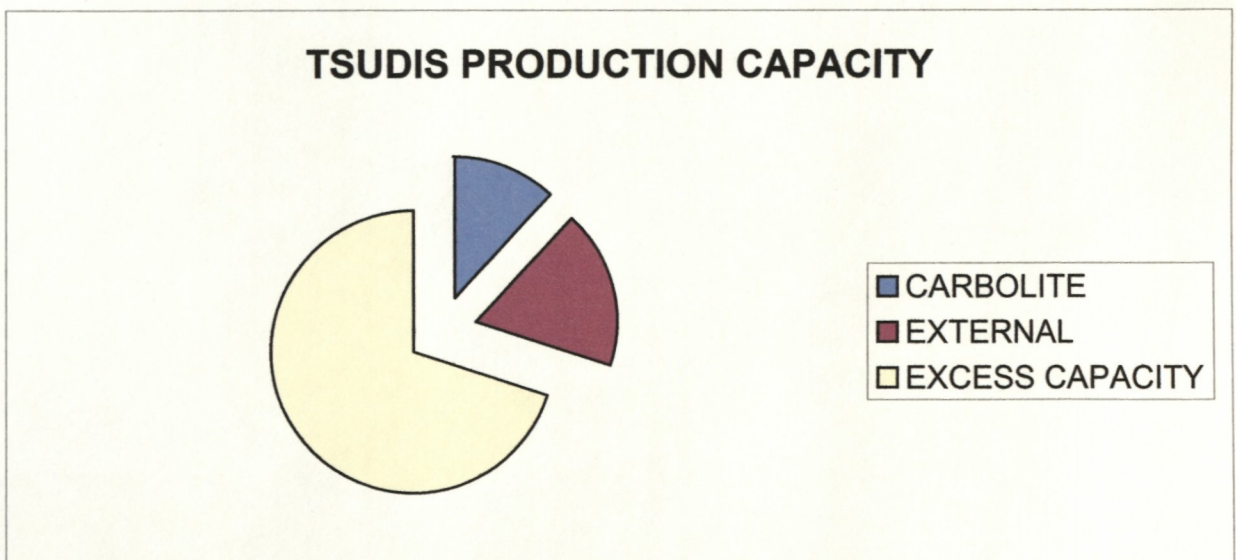
SOURCE: TSUDIS, 2004; ROSS 2002

TABLE 22
THE PRESENT VALUE OF TSUDIS CHOCOLATE COMPANY

END OF OPERATIONAL YEAR	OPERATIONAL CASH FLOW	5 YEAR EQUIPMENT	15 YEAR BUILDING	* NET CASH FLOW	PRESENT VALUE FACTOR 7%	PRESENT VAL NET CASH FL
2005	\$ 1,944,000.00	\$ 734,767.63	\$ 150,708.95	\$ 1,058,523.42	0.9346	\$ 989,295.99
2006	\$ 1,944,000.00	\$ 783,976.37	\$ 147,000.35	\$ 1,013,023.28	0.8734	\$ 884,774.53
2007	\$ 1,944,000.00	\$ 836,480.72	\$ 171,571.48	\$ 935,947.80	0.8163	\$ 764,014.19
2008	\$ 1,944,000.00	\$ 892,501.40	\$ 183,061.93	\$ 868,436.67	0.7629	\$ 662,530.34
2009	\$ 1,944,000.00	\$ 951,831.12	\$ 195,321.91	\$ 796,846.97	0.713	\$ 568,151.89
2010	\$ 1,944,000.00		\$ 208,402.99	\$ 1,735,597.01	0.6663	\$ 1,156,428.29
2011	\$ 1,944,000.00		\$ 222,360.13	\$ 1,721,639.87	0.6227	\$ 1,072,065.15
2012	\$ 1,944,000.00		\$ 237,252.02	\$ 1,706,747.98	0.582	\$ 993,327.32
2013	\$ 1,944,000.00		\$ 253,141.22	\$ 1,690,858.78	0.5439	\$ 919,658.09
2014	\$ 1,944,000.00		\$ 270,094.55	\$ 1,673,905.45	0.5083	\$ 850,846.14
2015	\$ 1,944,000.00		\$ 288,183.28	\$ 1,655,816.72	0.4751	\$ 786,678.52
2016	\$ 1,944,000.00		\$ 307,483.45	\$ 1,636,516.55	0.444	\$ 726,613.35
2017	\$ 1,944,000.00		\$ 328,076.20	\$ 1,615,923.80	0.415	\$ 670,608.38
2018	\$ 1,944,000.00		\$ 350,048.06	\$ 1,593,951.94	0.3878	\$ 618,134.56
2019	\$ 1,944,000.00		\$ 373,317.79	\$ 1,570,682.21	0.3624	\$ 569,215.23

Price of Firm	\$ (9,100,000.00)
Present Value of Firm	\$ 12,232,341.97
Present Value Factor	7%
Net Present Value of Firm	\$ 3,132,341.97
IRR	11.45%

CONCLUSION: ACCEPT PROPOSAL BASED ON NPV AND IRR
30 MILLION BARS FOR CARBOLITE
45 BARS FOR EXTERNAL MANUFACTURING



SOURCE: TSUDIS, 2004; ROSS, 2002

TABLE 23

OPERATIONAL CASH FLOW PROJECTIONS FOR TSUDIS CHOCOLATE

	NET				OPERATIONAL
	PROFIT MARGIN	BAR COST	BAR VOLUME		CASH FLOW
\$	-	\$ 0.30	60,000,000	\$	-
\$	0.03	\$ 0.30	60,000,000	\$	540,000.00
\$	0.06	\$ 0.30	60,000,000	\$	1,080,000.00
\$	0.09	\$ 0.30	60,000,000	\$	1,620,000.00
\$	0.12	\$ 0.30	60,000,000	\$	2,160,000.00
\$	-	\$ 0.27	30,000,000	\$	-
\$	0.03	\$ 0.27	30,000,000	\$	243,000.00
\$	0.06	\$ 0.27	30,000,000	\$	486,000.00
\$	0.09	\$ 0.27	30,000,000	\$	729,000.00
\$	0.12	\$ 0.27	30,000,000	\$	972,000.00
COMBINED CASH FLOW FOR TSUDIS CHOCOLATE:					\$ 2,349,000.00

SOURCE: TSUDIS, 2004; ROSS 2002

TABLE 24

THE PRESENT VALUE OF TSUDIS CHOCOLATE COMPANY

END OF OPERATIONAL YEAR	5 YEAR CASH FLOW	15 YEAR EQUIPMENT BUILDING	* NET CASH FLOW	PRESENT VALUE FACTOR 7%	PRESENT VAL NET CASH FL	
2005	\$ 2,349,000.00	\$734,767.63	\$ 150,708.95	\$ 1,463,523.42	0.9346	\$ 1,367,808.99
2006	\$ 2,349,000.00	\$783,976.37	\$147,000.35	\$ 1,418,023.28	0.8734	\$ 1,238,501.53
2007	\$ 2,349,000.00	\$836,480.72	\$171,571.48	\$ 1,340,947.80	0.8163	\$ 1,094,615.69
2008	\$ 2,349,000.00	\$892,501.40	\$183,061.93	\$ 1,273,436.67	0.7629	\$ 971,504.84
2009	\$ 2,349,000.00	\$951,831.12	\$195,321.91	\$ 1,201,846.97	0.713	\$ 856,916.89
2010	\$ 2,349,000.00		\$208,402.99	\$ 2,140,597.01	0.6663	\$ 1,426,279.79
2011	\$ 2,349,000.00		\$222,360.13	\$ 2,126,639.87	0.6227	\$ 1,324,258.65
2012	\$ 2,349,000.00		\$237,252.02	\$ 2,111,747.98	0.582	\$ 1,229,037.32
2013	\$ 2,349,000.00		\$253,141.22	\$ 2,095,858.78	0.5439	\$ 1,139,937.59
2014	\$ 2,349,000.00		\$270,094.55	\$ 2,078,905.45	0.5083	\$ 1,056,707.64
2015	\$ 2,349,000.00		\$288,183.28	\$ 2,060,816.72	0.4751	\$ 979,094.02
2016	\$ 2,349,000.00		\$307,483.45	\$ 2,041,516.55	0.444	\$ 906,433.35
2017	\$ 2,349,000.00		\$328,076.20	\$ 2,020,923.80	0.415	\$ 838,683.38
2018	\$ 2,349,000.00		\$350,048.06	\$ 1,998,951.94	0.3878	\$ 775,193.56
2019	\$ 2,349,000.00		\$373,317.79	\$ 1,975,682.21	0.3624	\$ 715,987.23

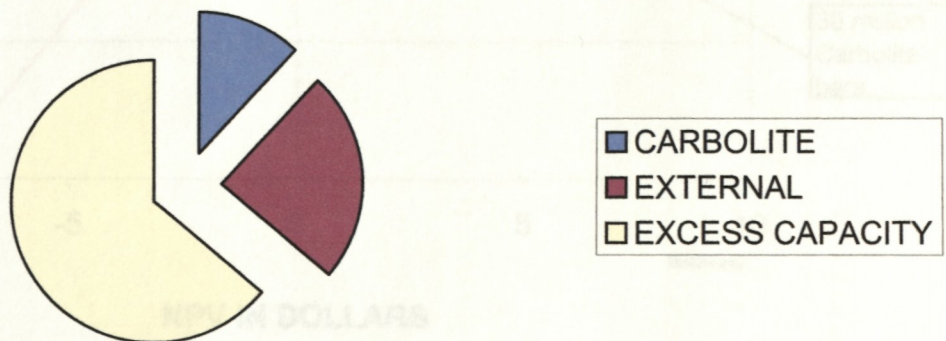
Price of Firm	\$ (9,100,000.00)
Present Value of Firm	\$ 15,920,960.47
Present Value Factor	7%
Net Present Value of Firm	\$ 6,820,960.47
IRR	16.32%

CONCLUSION: ACCEPT PROPOSAL BASED ON NPV AND IRR

30 MILLION BARS FOR CARBOLITE

60 BARS FOR EXTERNAL MANUFACTURING

TSUDIS PRODUCTION CAPACITY



SOURCE: TSUDIS, 2004; ROSS, 2002

CHART 6

**NET PRESENT VALUE FOR THE PRODUCTION OF 30 MILLION
CARBOLITE BARS (EXTERNALLY MANUFACTURED BARS
RANGING FROM 0 TO 60 MILLION)**

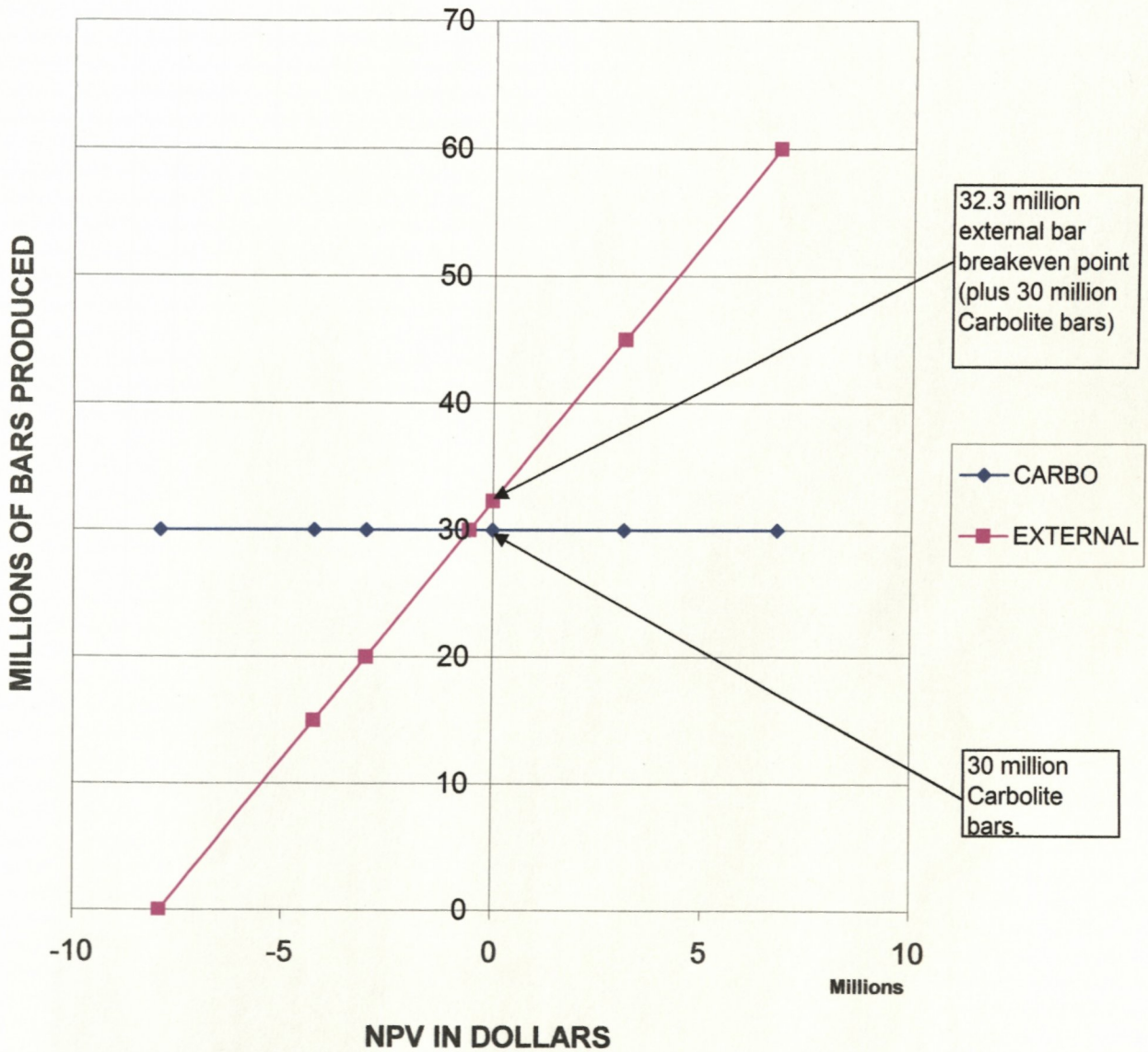


TABLE 25

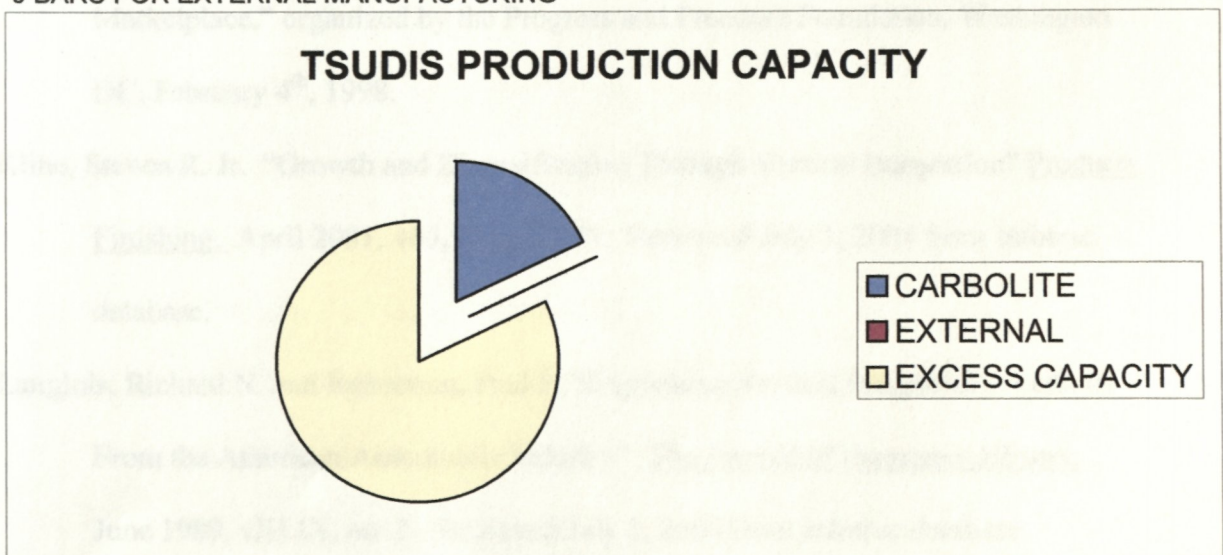
THE PRESENT VALUE OF TSUDIS CHOCOLATE COMPANY - PURCHASE 3 LINES, LEASE BUILDING

END OF YEAR	OPERATIONAL CASH FLOW	5 YEAR EQUIPMENT	15 Yr.LEASE BUILDING	* NET CASH FLOW	PRESENT VALUE FACTOR 7%	PRESENT VAL NET CASH FL.
2005	\$ 729,000.00	\$524,834.01	\$ 20,000.00	\$ 184,165.99	0.9346	\$ 172,121.53
2006	\$ 729,000.00	\$559,938.12	\$ 21,000.00	\$ 148,061.88	0.8734	\$ 129,317.25
2007	\$ 729,000.00	\$597,486.24	\$ 22,050.00	\$ 109,463.76	0.8163	\$ 89,355.27
2008	\$ 729,000.00	\$637,500.98	\$ 23,152.50	\$ 68,346.52	0.7629	\$ 52,141.56
2009	\$ 729,000.00	\$679,879.37	\$ 24,310.13	\$ 24,810.51	0.713	\$ 17,689.89
2010	\$ 729,000.00		\$ 25,525.64	\$ 703,474.36	0.6663	\$ 468,724.97
2011	\$ 729,000.00		\$ 26,801.92	\$ 702,198.08	0.6227	\$ 437,258.74
2012	\$ 729,000.00		\$ 28,142.02	\$ 700,857.98	0.582	\$ 407,899.34
2013	\$ 729,000.00		\$ 29,549.12	\$ 699,450.88	0.5439	\$ 380,431.33
2014	\$ 729,000.00		\$ 31,026.58	\$ 697,973.42	0.5083	\$ 354,779.89
2015	\$ 729,000.00		\$ 32,577.91	\$ 696,422.09	0.4751	\$ 330,870.13
2016	\$ 729,000.00		\$ 34,206.81	\$ 694,793.19	0.444	\$ 308,488.18
2017	\$ 729,000.00		\$ 35,917.15	\$ 693,082.85	0.415	\$ 287,629.38
2018	\$ 729,000.00		\$ 37,713.00	\$ 691,287.00	0.3878	\$ 268,081.10
2019	\$ 729,000.00		\$ 39,598.65	\$ 689,401.35	0.3624	\$ 249,839.05

Price of Equipment	\$ (3,000,000.00)
Present Value	\$ 3,954,627.62
Present Value Factor	7%
Net Present Value	\$ 954,627.62
IRR	10.41%

CONCLUSION: ACCEPT PROPOSAL BASED ON NPV AND IRR

30 MILLION BARS FOR CARBOLITE
0 BARS FOR EXTERNAL MANUFACTURING



REFERENCES

- Bruck, Felix. "Make Versus Buy: The Wrong Decisions Cost." The McKinsey Quarterly. Winter 1995, n1, pp 28-48. Retrieved July 1, 2004 from Infotrac database.
- Bullington, Kimball and Mpoyi, Richard. "The Impact of Supply Chain Improvement Initiatives on Cost Performance of Vertically Disintegrating Companies." Global Competitiveness. Annual 2002 v10, i1, pp 76-91. Retrieved July1, 2004 from Infotrac database.
- Carbone, Jim. "Contract Manufacturers Move to Vertical Integration". Purchasing. October 18, 2001, v130, i20, pp 33-77. Retrieved July 1, 2004 from Infotrac database.
- Dolan, Kerry A. and Meridith, Robyn. "Cover Story – Models of Production Management." Forbes. April 20, 2001, v167, i10 pp 106-114.
- Economides, Nicholas. "Competition and Vertical Integration in the Computing Industry" Stern School of Business, presented at the conference "Competition, Convergence and the Microsoft Monopoly: The Future of the Digital Marketplace," organized by the Progress and Freedom Foundation. Washington DC, February 4th, 1998.
- Kline, Steven R, Jr. "Growth and Diversification Through Vertical Integration" Products Finishing. April 2001, v65, i7 pp 65-71. Retrieved July 1, 2004 from Infotrac database.
- Langlois, Richard N. and Robertson, Paul L. "Explaining Vertical Integration: Lessons From the American Automobile Industry" The Journal of Economic History. June 1989, vXLIX, no. 2. Retrieved July 1, 2004 from Infotrac database.

Lish, Michael. Personal Interview. 20 Jul. 2004

Levenstein, Margaret C. "Vertical Integration" Prepared for the Oxford Encyclopedia of Economic History. June 3, 2002. Retrieved July 1, 2004 from Infotrac database.

Malburg, Chris. "Value Creation – Vertical Integration". Industry Week on the Web. December 11, 2000.

<<http://www.industryweek.com/Columns/ASP/columns.asp?ColumnId=719>

McAfee, Preston R. "The Effects of Vertical Integration on Competing Input Suppliers" Economic Review (Cleveland). Winter 1999, v35, i1 pp 2-14. Retrieved July 1, 2004 from Infotrac database.

Miller, John. Personal Interview. 25 Jun 2004.

Muldoon, Katie. "Say Goodbye to Vertical Integration" Direct. October 15, 2003. v15, i14. Retrieved July 1, 2004 from Infotrac database.

Mpoyi, Richard T. "Vertical Integration: Strategic Characteristics and Competitive Implications". Competitiveness Review. Winter-Spring 2003, v13, i1 pp 44-56. Retrieved July 1, 2004 from Infotrac database.

Panchak, Patricia. "The Virtues of Vertical Integration: An Intense Focus on Design Supported by Vertically Integrated Manufacturing Gives Crown Equipment Corp. an Edge in a Mature Market." Industry Week September 2003, v252, i9 pp 50-56. Retrieved July 1, 2004 from Infotrac database.

Polet, Roeland. Personal interview. 27 Jul. 2004.

Ross, Stephen, Westerfield, Randolph and Jaffee, Jeffrey Stuckey, Corporate Finance (New York, NY: McGraw-Hill, 2002) 94-95.

Stuckey, John and White, David. "When and When Not to Vertically Integrate. The McKinsey Quarterly. Summer 1993, n3 pp 3-27. Retrieved July 1, 2004 from Infotrac database.

Tsudis, Pete. Personal interview. 16 Aug 2004.