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In This Issue: **Planning a New Parlor**

Planning a New Parlor

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Dairying is in a state of change. The industry is moving and building new dairy facilities in areas such as Colorado, Kansas, and Nebraska and the high plains of Texas. Producers in the more traditional dairy areas are expanding and building new milking centers. Most producers have definite ideas about parlor design and size.

In the process of planning for the new facility, the typical producer will contact one or more contractors. Each contractor will present concept plans and an estimate of costs. During the planning and negotiating stage, the producer should use the bids from the contractors to budget the expected income flow from the proposed construction. A lender will require a fairly detailed budget of the proposal. Most importantly, if the cost of the new facility cannot be covered with the expected cash flow then the dairy will fail.

This article contains analyses of the economics of several types of parlors. The technique used to analyze the financial decisions can be used by any producer. The facilities portrayed in this example are larger than many in Texas and other Western and Southwestern States. The cost of production data we use, and the physical parameters such as cull rates, calf crop, rations, feed costs, labor parameters, and other variable costs, are from the Texas A&M University, Agricultural and Food Policy Center, New Mexico representative farm[2]. Parlor installation costs

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[2] For an explanation of the Representative Farms see "Representative Farms Economic Outlook For January 2000 FAPRI/AFPC Baseline". AFPC Working Paper 00-1. AFPC, Dept. of Agricultural Economics, Texas A&M University, College Station, TX. January 2000.

were derived from information cited in footnote 4 and from the personal experience of one of the authors who is directly involved in a western milk production operation. We assumed the current facility is a double 45 herringbone. Currently, a total of 3,150 cows are milked twice a day. Each milking takes 10 hours. We developed four options: 1) remodel the current facility; 2) construct a new double 40 parallel, 3) construct a new double 40 30-inch herringbone, 4) construct a new sixty stall rotary.

First Things First

Begin the parlor analysis by asking yourself : 1) why you want to remodel, replace, or construct a parlor; 2) what type of facility you want to construct; 3) where you want to construct the facility; 3) when you want to construct the facility; 4) if you want to hire the complete job done, or if you want to do part of the work yourself.

Why?

Make sure you really know why you are investing in a new parlor. Are you relocating your dairy? Is your old parlor too small? Is your old parlor worn out? Just make sure you know why you really want to construct a new parlor. Then make sure that the new parlor fits that need.

What type?

The type of parlor you should construct depends on your long term goals. How many years do you want to use the parlor? How many cows do you plan to milk every 24 hours? How many employees are you willing to manage? During the process of collecting price information and studying plans and contractor bids, you need to determine the facility size consistent with the long term cow capacity of your dairy. If you have no long term goal to milk 5,000 cows, then make sure you are not going to build a facility that you cannot support with fewer cows. Some parlors can be constructed so they can be expanded at a later date. Keep that in mind when you are discussing your plans with dealers and contractors.

Where?

Where you plan to locate affects what you should build. Weather and climate are important considerations. You don't want to over or under build. You must consider the topography where the parlor is to be constructed. You must also consider the environmental regulations in the area and the applicable building regulations.

When?

Timing is everything. In particular, cash flow will vary throughout the year. Cash flow seasonality will influence the timing and the amount of operating capital you need to borrow. You want to consider the seasonality of milk production, cow freshenings, and seasonal pricing.

Who constructs the Facility?

Will you retain a contractor, or will you do any of the construction with your own employees? Consider the time available to construct the facility, and the skills necessary to construct it. A do it yourself job may be more costly in the long run, because of mistakes or unanticipated problems that can occur during construction.

Addressing the why, where, what, when and who will do the work questions will help you focus on the parlor that best fits your needs. It will help you to articulate your needs to a lender. Answering these questions will help to remove any nagging doubt about undertaking the project.

Shopping for Parlors

There are several popular parlor configurations available: herringbones, thirty-inch herringbones, parallels, and rotaries. You should familiarize yourself with parlor characteristics such as the number of cows that can be milked per hour, detachers, crowd gates, and numbers of workers required. Table 1 presents the performance of 35 parallel parlors evaluated by Smith et al.[3]

In a three country study of rotary milking parlors Armstrong et. al.[4] points out some of the parameters that need to be considered when choosing a parlor (Table 2). Actual entry time per cow in seconds exceeded the time expected in theory. That means it takes a little longer tan expected to get the cows in and out. These parlors have also milked fewer cows per hour than was expected. This type of information is vital to planning a new parlor.

Data provided by equipment dealers suggests that a milking center currently costs between $4,000 and $5,500 per cow milked per hour. Equipment alone will run from $2,000 to $3,000 per cow milked per hour, installed [5]. Table 3 presents current estimates of the prices of major milking parlor components, and Table 4 resents estimates of the total cost of constructing various types of new parlors.

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[3]Smith, John F, D. V. Armstrong, M. J. Gamroth, W. T. Weichert, Frank Wiersma. Parallel Milking Parlor Performance and Design Consideration. New Mexico State University, 1993

[4]Armstrong, Dennis, John F. Smith, and Mike Gamroth. Materials provided to authors, Summer 2000.

[5]We contacted several dealers in Texas, and producers in Colorado to get actual installed prices.

Table 1: Steady-state through-put performance of 35 parallel parlors, Smith e.t al.

Parlor size	No. parlors	Workers Needed	Avg. cows/hr.	Range, cows/hr
Double 10	2	1	87	84-90
Double 12	1	2	120	120
Double 14	4	1	116	110-121
Double 20	1	1	92	72-106
Double 20	1	1	128	128
Double 20	3	2	160	155-165
Double 20	5	3	203	170-243
Double 24	4	2	203	125-143
Double 25	2	3	233	230-235
Double 30	2	3	270	270-271
Double 32	1	3	288	288

Table 2: Rotary Milking Palor Performance on Commercial Dairies, from Armstrong, Smith, & Gamroth.

Range Number of Stalls	Avg Number of Stalls	Theory Entry per Stall (sec)	Actual Entry per Stall (sec)	Milk Freq.	Theory cows/hr	Actual* cows/hr	Number of workers	% Actual/Theory	Avg. Milkl Production per cow per day
28-37	33	17.5	22.0	3	210	167	2	79.5%	70.3
40-40	40	12.8	14.4	3	291	226	3	79.4%	65.9
48-48	48	10.2	12.8	2	356	270	2	76.8%	61.4
50-50	50	10.6	12.3	2	348	282	2	82.0%	67.5
54-54	54	8.0	9.5	3	451	371	3	82.0%	69.0
60-60	60	8.2	10.0	2	441	329	4	75.0%	67.3
72-72	72	6.6	8.0	2	545	440	4	81.0%	63.0
80-80	80	5.4	5.8	3	675	548	5	82.0%	61.5
100-116	108	5.4	5.9	3	691	501	4	72.0%	73.5
AVG	53	10.7	12.7	3	384	298	3	78.7%	66.4
MIN	28	4.5	5.1	2	180	139	1	55.0%	54.0
MAX	116	20.0	25.7	4	800	597	5	90.0%	89.0

Table 3 Estimated Price of Components for Milking Parlor	
Component	**Range of Prices per Parlor Stall**
Stalls	$1,300– $3,400
Cooling	$1,800– $2,400
Vacuum	$300– $450
Claw clusters	$200– $600
Automation	$1,000– $2,300
Computerization	$3,700– $3,900
Installation	$400– $550
Building shell, drip area	$8000– $12,700

Table 4 Estimated Price of Four Types of Milking Facilities, In thousands of dollars, August 2000

Type of Parlor	Equipment	Structure	Total
Double 40 30" Herringbone	$700– 900	$650– 750	$1,350– 1,650
Double 45 Herringbone	900– 1,000	700– 800	1,600– 1,800
Double 40 Parallel	650– 750	600– 650	1,250– 1,400
70 Stall Rotary	800– 850	850– 900	1,650– 1,750

The Partial Budget

A partial budget is used to analyze the changes in expected net returns resulting from each alternative parlor. The partial budget measures only the change in the returns. A partial budget allows the comparison of the impacts of the income and cost changes resulting from each option. Table 5 presents the partial budget used to analyze the alternatives. For example, adopting alternative 1 increases daily net returns $292.06 above the current system. In the example analysis, adopting alternative 4 increases daily net returns $1,356.16 above net returns from the current system. Our budget is on a daily basis, then the daily net returns are converted to an annual basis.

The daily budget is divided into 4 parts: 1) changes that result in increased income; 2) changes that result in reduced costs; 3) changes that result in increased costs; 4) changes that result in decreased income. The first change incorporated into the budget is the change in the

number of cows that can be milked. Both the double 40 parallel and the double 40, 30-inch herringbone allow 50 more cows a day to be milked. The 60 stall rotary allows us to milk 125 more cows per day. Added income results from added milk from the increase in cow numbers. The increase in milk cows will increase the number of cull cows and calves sold. We assumed a cull rate of 33 percent per year.

We assumed over the course of a year, twenty seven additional calves will be sold from both the dairy installing double 40 parallel and the dairy installing the double forty 30-inch herringbone. An added sixty eight calves will be sold from the dairy installing the rotary. Part two of the budget shows no cost savings. Part three indicates increased feed costs, increased variable costs, increased cow ownership costs, increased utilities, increased repairs, and increased labor costs.

Cow ownership costs include interest paid on cow loans and other miscellaneous costs. In Table 5, columns 1 through 4 contain the changes in milk production, cows, and workers. Column 5 presents the dollar value per unit of milk, cows, feed and labor. Columns 6 through 9 contain the total value of the change in each item that results from adopting each alternative.

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Table 5: Partial Budget to Compare Milking Parlor Alternatives

Cows milked	3,150	3,200	3,200	3,312		Dbl 45 Hb	Dbl 40 Parallel	Dbl 40 30" HB	60 Stall Rotary
System	Dbl 45 Hb	Dbl 40 Parallel	Dbl 40 30" HB	60 Stall Rotary					
investment per cow	$ 279.35	$ 259.38	$ 257.80	$ 274.14					
comparison	Altrnative 1	Alternative 2	Alternative 3	Alternative 4		Alternative 1	Alternative 2	Alternative 3	Alternative 4
What is to be done	remodel current	build new	build new	build new	Dollars per Unit	Value	Value	Value	Value
I. Income increases									
added milk from cows in pounds per day	3,150	3,350	3,350	10,854	$ 13.50	$ 425.25	$ 452.25	$ 452.25	$ 1,465.29
added cull cow sales per day	-	0.0450	0.04500	0.1130	$ 443.00	$ -	$ 19.94	$ 19.94	$ 50.06
added calf sales per day	-	0.074	0.074	0.185	$ 40.00	$ -	$ 2.96	$ 2.96	$ 7.40
Total of Income Increases Section						$ 425.25	$ 475.15	$ 475.15	$ 1,522.75
II. Cost savings									
milking labor in total people per day	-	-	-	-	$ -	$ -	$ -	$ -	$ -
other labor				-	$ -	$ -	$ -	$ -	$ -
repairs to curent system						$ -	$ -	$ -	$ -
Total of Cost Savings Section						$ -	$ -	$ -	$ -
III. Total of sections 1 and 2						$ 425.25	$ 475.15	$ 475.15	$ 1,522.75
IV. Added costs									
feed pounds per day	2,100	2,233	2,233	7,236	$ 0.05	$ 105.00	$ 111.67	$ 111.67	$ 361.80
added cash costs above feed per day per milk yield	3,150	3,350	3,350	10,854	$ 0.0156	$ -	$ 52.26	$ 52.26	$ 169.32
added cost of cow ownership per day per cow	-	50	50	125	$ 0.97	$ -	$ 48.50	$ 48.50	$ 121.25
utilities per pound of milk	3,150	3,350	3,350	10,854	$ 0.00260	$ 8.19	$ 8.71	$ 8.71	$ 28.22
added repairs per day	50	50	50	125	$ -	$ 20.00	40.00	44.00	44.00
added labor milking labor per day	-	-	-	(6)	$ 93.00		$ -	$ -	$ (558.00)
added other labor per day	-	-	-	-	$ 93.00		$ -	$ -	$ -
Total Added Costs						$ 133.19	$ 261.14	$ 265.14	$ 166.59
V. Reduced income									
Total of sections 4 and 5						$ 133.19	$ 261.14	$ 265.14	$ 166.59
Added net returns						$ 292.06	$ 214.01	$ 210.01	$ 1,356.16
	Altrnative 1	Alternative 2	Alternative 3	Alternative 4					
Annual Added Net Returns	***$ 106,602***	***$ 78,113***	***$ 76,653***	***$ 494,997***					

Financing

Table 6 presents the details of financing the facility construction and amortization of the loan. Remodeling the current facility is estimated to cost $879,945. A twenty percent down payment is required for the remodeling project, with the remaining 80 percent of the cost being financed. We estimate a slightly higher interest rate for the remodeling loan.

The loan for remodeling is for seven years, and ten years for the alternatives. The economic life of the remodeled facility is ten years, and fifteen years for the alternatives. The economic life can be thought of as the depreciable life and also the physically useful life of the facility before it becomes obsolete, or needs major repair. The loan amortization information comes from your lender or can be estimated using the financial functions found in most computer spread sheets such as Excel or Quattro Pro.

Table 6: Financing and Loan Amortization

Comparison		Alternative 1	Alternative 2	Alternative 3	Alternative 4
System		Dbl 45 Hb	Dbl 40 Parallel	Dbl 40 30" HB	60 Stall Rotary
Capacity per day		3,150	3,200	3,200	3,312
Remodel cost	$	879,945			
Turnkey installation cost			$ 830,018	$ 824,945	$ 907,945
Economic life in years	10		15	15	15
Length of loan	7		10	10	10
Required downpayment	$	175,989	$ 83,002	$ 82,495	$ 90,795
Amount of loan	$	703,956	$ 747,016	$ 742,451	$ 817,151
Rate		9.08%	8.75%	8.75%	8.75%
Annual loan payment		$140,245.06	$115,122.41	$114,418.79	$125,930.78
Principal payment	year				
	1	$76,325.85	$49,758.49	$49,454.37	$54,430.11
	2	$83,256.24	$54,112.36	$53,781.63	$59,192.75
	3	$90,815.90	$58,847.19	$58,487.52	$64,372.12
	4	$99,061.99	$63,996.32	$63,605.18	$70,004.68
	5	$108,056.82	$69,596.00	$69,170.64	$76,130.08
	6	$117,868.38	$75,685.65	$75,223.07	$82,791.47
	7	$128,570.82	$82,308.14	$81,805.08	$90,035.72
	8		$89,510.11	$88,963.03	$97,913.85
	9		$97,342.24	$96,747.29	$106,481.31
	10		$105,859.69	$105,212.68	$115,798.42
Total Principal		$703,956.00	$747,016.20	$742,450.50	$817,150.50
Interest payment	year				
	1	$63,919.20	$65,363.92	$64,964.42	$71,500.67
	2	$56,988.82	$61,010.05	$60,637.16	$66,738.03
	3	$49,429.15	$56,275.22	$55,931.27	$61,558.67
	4	$41,183.07	$51,126.09	$50,813.61	$55,926.11
	5	$32,188.24	$45,526.41	$45,248.16	$49,800.70
	6	$22,376.68	$39,436.76	$39,195.73	$43,139.32
	7	$11,674.23	$32,814.27	$32,613.71	$35,895.06
	8		$25,612.30	$25,455.76	$28,016.94
	9		$17,780.17	$17,671.50	$19,449.48
	10		$9,262.72	$9,206.11	$10,132.36
Total Interest		$277,759.39	$404,207.90	$401,737.42	$442,157.33

Depreciation and Tax Savings

This investment results in the annual business expenses of depreciation and loan interest. Business expenses are tax deductible. At the marginal tax rate, these deductions generate tax savings. We assumed a marginal tax rate of twenty-eight percent. This tax saving becomes a cash inflow. Table 7 presents the calculated depreciation for the remodeling of the current facility and the three alternatives. Table 8 presents the calculated tax savings using the twenty-eight percent marginal tax rate. For example, remodeling the current facility results in $72,450 per year in depreciation, which results in a tax saving of $20,286 per year. First year interest on the loan to remodel the current facility is $52,628 which results in a tax savings of $14,736. The total first year tax saving from depreciation and interest in this example is $35,022.

Cash Flow

Tables 9 through 12 present the annual cash flow budget for remodeling the current facility, which we refer to as alternative 1 and each of the alternatives, two through four. The partial budget is calculated on a daily basis because it is easier to relate to the operation of the milking facility. It may be easier to think in terms of the average daily cow capacity and quantity of milk sold. The daily net revenues are converted to an annual expected cash flow stream. This annual cash flow stream is the "extra" cash flow generated from the change made to our system. It is assumed that if facility changes are not made income will continue to be generated from the old facility. The cash flows represent the change in cash flow expected to occur if we opt to remodel or the construct one of the alternatives. The changes in cash in-flow from the changes in facilities must be able to cover the changes in cash out-flow that result.

The cash flow consists of seven columns. Column 1 is the expected cash flow stream from the changes in the system. In year 0, the year construction or remodeling begins with a down payment generating a negative cash flow. There may actually be more than a 1 year time lag from the down payment until income is generated from operating the facility. When operation begins, a cash flow stream will be generated for each year of the economic life. Table 9 presents the expected annualized net returns from the partial budget for remodeling the current operation. Remodeling is expected to generate increased daily net returns of $477 per day, which is $174,127 per year.

The expected tax savings (column 2) is added to the expected cash flow stream because this money stays in the operation. Both principal payment on the loan (column 3) and interest payment (column 4) are outflows against the cash flow stream. The after tax net cash flow results from adding the cash flow stream to the tax savings and subtracting the annual principal payment and interest payment.

The discounted after tax cash flow (column 7) is the present value of the future cash flow from each alternative. The discount factor [$1/(1+r)^n$] where r is the discount rate and n is the year is applied to net after tax cash flow fore each year, and the results added together to get the

net present value of the future income stream expected from each of the changes analyzed. The bigger *r* is the more risky you expect the project to be. The discount rate reflects your estimates of the interest rate for borrowed money, the inflation rate, general economic conditions, and the rate of return you expect your resources to earn in a comparable risk investment over their economic life if the funds were not invested in this project. This project is competing with other opportunities for your investment dollar. The smaller *r* is, the less risky and the fewer investment opportunities you feel you have. As long as the sum of the discounted values is zero or greater, the investment is theoretically viable. In this example, remodeling and alternative 1 and alternative 3 are viable using this test. However, alternative 1, realistically is not viable, because it generates negative after tax cash flows for the first nine years. In other words a dairy producer would be dipping deeper into total returns from the dairy above those generated from the changes alone, in order to make principal and interest payments.

Table7: Depreciation

Comparison		Alterative 1	Alternative 2	Alternative 3	Alternative 4
System		Dbl 45 Hb	Dbl 40 Parallel	Dbl 40 30" HB	60 Stall Rotary
Investment		$ 879,945	$ 830,018	$ 824,945	$ 907,945
Economic life		10	15	15	15
Years	1	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	2	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	3	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	4	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	5	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	6	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	7	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	8	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	9	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	10	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	11		$ 55,335	$ 54,996	$ 60,530
	12	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	13	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	14	$ 87,995	$ 55,335	$ 54,996	$ 60,530
	15	$ 87,995	$ 55,335	$ 54,996	$ 60,530

Table 8: Tax Savings

		Alternative 1			Alternative 2			Alternative 3			Alternative 4		
28%		Depreciation	Interest	Total	Depreciation	Interest	Total	Depreciation	Interest	Total	Depreciation	Interest	Total
Years	1	$ 24,638	$ 17,897	$ 42,536	$ 15,494	$ 18,302	$ 33,796	$ 15,399	$ 18,190	$ 33,589	$ 16,948	$ 20,020	$ 36,968
	2	$ 24,638	$ 15,957	$ 40,595	$ 15,494	$ 17,083	$ 32,576	$ 15,399	$ 16,978	$ 32,377	$ 16,948	$ 18,687	$ 35,635
	3	$ 24,638	$ 13,840	$ 38,479	$ 15,494	$ 15,757	$ 31,251	$ 15,399	$ 15,661	$ 31,060	$ 16,948	$ 17,236	$ 34,185
	4	$ 24,638	$ 11,531	$ 36,170	$ 15,494	$ 14,315	$ 29,809	$ 15,399	$ 14,228	$ 29,627	$ 16,948	$ 15,659	$ 32,608
	5	$ 24,638	$ 9,013	$ 33,651	$ 15,494	$ 12,747	$ 28,241	$ 15,399	$ 12,669	$ 28,068	$ 16,948	$ 13,944	$ 30,893
	6	$ 24,638	$ 6,265	$ 30,904	$ 15,494	$ 11,042	$ 26,536	$ 15,399	$ 10,975	$ 26,374	$ 16,948	$ 12,079	$ 29,027
	7	$ 24,638	$ 3,269	$ 27,907	$ 15,494	$ 9,188	$ 24,682	$ 15,399	$ 9,132	$ 24,531	$ 16,948	$ 10,051	$ 26,999
	8	$ 24,638		$ 24,638	$ 15,494	$ 7,171	$ 22,665	$ 15,399	$ 7,128	$ 22,527	$ 16,948	$ 7,845	$ 24,793
	9	$ 24,638		$ 24,638	$ 15,494	$ 4,978	$ 20,472	$ 15,399	$ 4,948	$ 20,347	$ 16,948	$ 5,446	$ 22,394
	10	$ 24,638		$ 24,638	$ 15,494	$ 2,594	$ 18,087	$ 15,399	$ 2,578	$ 17,977	$ 16,948	$ 2,837	$ 19,785
	11	$ -		$ -	$ 15,494		$ 15,494	$ 15,399		$ 15,399	$ 16,948		$ 16,948
	12	$ 24,638		$ 24,638	$ 15,494		$ 15,494	$ 15,399		$ 15,399	$ 16,948		$ 16,948
	13	$ 24,638		$ 24,638	$ 15,494		$ 15,494	$ 15,399		$ 15,399	$ 16,948		$ 16,948
	14	$ 24,638		$ 24,638	$ 15,494		$ 15,494	$ 15,399		$ 15,399	$ 16,948		$ 16,948
	15	$ 24,638		$ 24,638	$ 15,494		$ 15,494	$ 15,399		$ 15,399	$ 16,948		$ 16,948

Table 9:Expected Cash Flow Budget After Remodeling Current Facility: Alternative 1

Year	col. 1 Expected Cash flow Stream	col. 2 Expected Tax Savings	col. 3 Annual Principal Payment	col. 4 Annual Interest Payment	col. 5 After Tax Net Cash Flow	col. 6 Discount Factor	col. 7 Discounted After Tax Cash Flow
0	$ (175,989.00)				$ (175,989)	1	$ (175,989)
1	$ 106,602	$ 42,536	$ 76,326	$ 63,919	$ 8,893	0.9237875289	$ 8,215
2	$ 106,602	$ 40,595	$ 83,256	$ 56,989	$ 6,952	0.8533833985	$ 5,933
3	$ 106,602	$ 38,479	$ 90,816	$ 49,429	$ 4,835	0.7883449409	$ 3,812
4	$ 106,602	$ 36,170	$ 99,062	$ 41,183	$ 2,527	0.7282632248	$ 1,840
5	$ 106,602	$ 33,651	$ 108,057	$ 32,188	$ 8	0.6727604848	$ 5
6	$ 106,602	$ 30,904	$ 117,868	$ 22,377	$ (2,739)	0.6214877458	$ (1,702)
7	$ 106,602	$ 27,907	$ 128,571	$ 11,674	$ (5,736)	0.5741226289	$ (3,293)
8	$ 106,602	$ 24,638			$ 131,240	0.5303673246	$ 69,606
9	$ 106,602	$ 24,638			$ 131,240	0.4899467202	$ 64,301
10	$ 106,602	$ 24,638			$ 131,240	0.4526066699	$ 59,400
11	$ (175,989.00)						$ (175,989)
12	$ 106,602	$ 42,536	$ 76,326	$ 63,919	$ 8,893	0.923787529	$ 8,215
13	$ 106,602	$ 40,595	$ 83,256	$ 56,989	$ 6,952	0.853383398	$ 5,933
14	$ 106,602	$ 38,479	$ 90,816	$ 49,429	$ 4,835	0.788344941	$ 3,812
15	$ 106,602	$ 36,170	$ 99,062	$ 41,183	$ 2,527	0.728263225	$ 1,840
TOT	$ 1,140,449	$ 481,937	$ 1,053,416	$ 489,280	$ 255,679		$ (124,062)

Table10: Expected Cash Flow Budget from Alternative 2

Year	col. 1 Expected Cash flow Stream	col. 2 Expected Tax Savings	col. 3 Annual Principal Payment	col. 4 Annual Interest Payment	col. 5 After Tax Net Cash Flow	col. 6 Discount Factor	col. 7 Discounted After Tax Cash Flow
0	$ (83,001.80)				$ (83,002)	1	$ (83,002)
1	$ 78,113	$ 33,796	$ 49,758	$ 65,364	$ (3,214)	0.9237875289	$ (2,969)
2	$ 78,113	$ 32,576	$ 54,112	$ 61,010	$ (4,433)	0.8533833985	$ (3,783)
3	$ 78,113	$ 31,251	$ 58,847	$ 56,275	$ (5,759)	0.7883449409	$ (4,540)
4	$ 78,113	$ 29,809	$ 63,996	$ 51,126	$ (7,200)	0.7282632248	$ (5,244)
5	$ 78,113	$ 28,241	$ 69,596	$ 45,526	$ (8,768)	0.6727604848	$ (5,899)
6	$ 78,113	$ 26,536	$ 75,686	$ 39,437	$ (10,473)	0.6214877458	$ (6,509)
7	$ 78,113	$ 24,682	$ 82,308	$ 32,814	$ (12,328)	0.5741226289	$ (7,078)
8	$ 78,113	$ 22,665	$ 89,510	$ 25,612	$ (14,344)	0.5303673246	$ (7,608)
9	$ 78,113	$ 20,472	$ 97,342	$ 17,780	$ (16,537)	0.4899467202	$ (8,102)
10	$ 78,113	$ 18,087	$ 105,860	$ 9,263	$ (18,922)	0.4526066699	$ (8,564)
11	$ 78,113	$ 15,494			$ 93,607	0.4181123972	$ 39,138
12	$ 78,113	$ 15,494			$ 93,607	0.3862470182	$ 36,155
13	$ 78,113	$ 15,494			$ 93,607	0.3568101785	$ 33,400
14	$ 78,113	$ 15,494			$ 93,607	0.3296167930	$ 30,854
15	$ 78,113	$ 15,494			$ 93,607	0.3044958827	$ 28,503
TOT	$ 1,088,693.83	$345,583.25	$ 747,016.20	$ 404,207.90	$ 283,053		$ 24,753

Table 11:Expected Cash Flow Budget from Alternative 3

Year	col. 1 Expected Cash flow Stream	col. 2 Expected Tax Savings	col. 3 Annual Principal Payment	col. 4 Annual Interest Payment	col. 5 After Tax Net Cash Flow	col. 6 Discount Factor	col. 7 Discounted After Tax Cash Flow
0	$ (82,494.50)				$ (82,495)	1	$ (82,495)
1	$ 76,653	$ 33,589	$ 49,454	$ 64,964	$ (4,177)	0.9237875289	$ (3,858)
2	$ 76,653	$ 32,377	$ 49,454	$ 64,964	$ (5,388)	0.8533833985	$ (4,598)
3	$ 76,653	$ 31,060	$ 49,454	$ 64,964	$ (6,706)	0.7883449409	$ (5,287)
4	$ 76,653	$ 29,627	$ 49,454	$ 64,964	$ (8,139)	0.7282632248	$ (5,927)
5	$ 76,653	$ 28,068	$ 49,454	$ 64,964	$ (9,697)	0.6727604848	$ (6,524)
6	$ 76,653	$ 26,374	$ 49,454	$ 64,964	$ (11,392)	0.6214877458	$ (7,080)
7	$ 76,653	$ 24,531	$ 49,454	$ 64,964	$ (13,235)	0.5741226289	$ (7,598)
8	$ 76,653	$ 22,527	$ 49,454	$ 64,964	$ (15,239)	0.5303673246	$ (8,082)
9	$ 76,653	$ 20,347	$ 49,454	$ 64,964	$ (17,419)	0.4899467202	$ (8,534)
10	$ 76,653	$ 17,977	$ 49,454	$ 64,964	$ (19,789)	0.4526066699	$ (8,957)
11	$ 76,653	$ 15,399			$ 92,052	0.4181123972	$ 38,488
12	$ 76,653	$ 15,399			$ 92,052	0.3862470182	$ 35,555
13	$ 76,653	$ 15,399			$ 92,052	0.3568101785	$ 32,845
14	$ 76,653	$ 15,399			$ 92,052	0.3296167930	$ 30,342
15	$ 76,653	$ 15,399			$ 92,052	0.3044958827	$ 28,029
TOT	$ 1,067,301.13	$343,471.08	$ 494,543.73	$ 649,644.19	$ 266,584		$ 16,318

Table 12:ExpectedCash Flow from Alternative 4

Year	col. 1 Expected Cash flow Stream	col. 2 Expected Tax Savings	col. 3 Annual Principal Payment	col. 4 Annual Interest Payment	col. 5 After Tax Net Cash Flow	col. 6 Discount Factor	col. 7 Discounted After Tax Cash Flow
0	$ (90,794.50)				$ (90,795)	1	$ (90,795)
1	$ 494,997	$ 36,968	$ 54,430	$ 71,501	$ 406,035	0.9237875289	$ 375,090
2	$ 494,997	$ 35,635	$ 59,193	$ 66,738	$ 404,701	0.8533833985	$ 345,365
3	$ 494,997	$ 34,185	$ 64,372	$ 61,559	$ 403,251	0.7883449409	$ 317,901
4	$ 494,997	$ 32,608	$ 70,005	$ 55,926	$ 401,674	0.7282632248	$ 292,524
5	$ 494,997	$ 30,893	$ 76,130	$ 49,801	$ 399,959	0.6727604848	$ 269,076
6	$ 494,997	$ 29,027	$ 82,791	$ 43,139	$ 398,094	0.6214877458	$ 247,410
7	$ 494,997	$ 26,999	$ 90,036	$ 35,895	$ 396,065	0.5741226289	$ 227,390
8	$ 494,997	$ 24,793	$ 97,914	$ 28,017	$ 393,859	0.5303673246	$ 208,890
9	$ 494,997	$ 22,394	$ 106,481	$ 19,449	$ 391,460	0.4899467202	$ 191,795
10	$ 494,997	$ 19,785	$ 115,798	$ 10,132	$ 388,852	0.4526066699	$ 175,997
11	$ 494,997	$ 16,948			$ 511,945	0.4181123972	$ 214,051
12	$ 494,997	$ 16,948			$ 511,945	0.3862470182	$ 197,737
13	$ 494,997	$ 16,948			$ 511,945	0.3568101785	$ 182,667
14	$ 494,997	$ 16,948			$ 511,945	0.3296167930	$ 168,746
15	$ 494,997	$ 16,948			$ 511,945	0.3044958827	$ 155,885
TOT	$ 7,334,160.70	$378,028.65	$ 817,150.50	$ 442,157.33	$ 6,452,882		$ 3,479,730

Alternative 1 is remodeling the current facility. If this option is adopted, then we will have to remodel again in year eleven. The cash flow reflects this remodeling and then the cash flow for years 11 through 15.

Concluding Comments

The purpose of this release is to present a technique for dairy producers to analyze an investment in a new parlor for an existing operation. The partial budget lends itself to this type of analysis because it captures the changes that will occur in net returns when the new investment is made.

The results of our analysis indicate that of the options we investigate, only remodeling the current facility or constructing a new 60 stall rotary parlor were justified. A word of caution! The conclusion reached here are based on the data we used and the assumptions we made to do our analysis. If you are a dairy producer, you need to do your own analysis based on your own cost and return information and the information you receive from dealer and contractors.

An Excel 97 spreadsheet template was developed to do this analysis. If you would like to have a copy of this template contact either Bud Schwart or David Anderson in the Department of Agricultural Economics at Texas A&M University or any of the other authors at their respective Universities.