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Five policy scenarios are compared to the base 1982 condition: milk price equal to 65 and 70 percent of parity and a flat (no classified pricing under federal milk orders) milk price equal to 70 percent of parity. A fourth scenario evaluates the rate of return on investment for managers that achieve a milk production per cow equal to the average of the top 20 percent of producers using the Dairy Herd Improvement Association testing program in their respective states. The base 1982 prices are assumed for this scenario. A fifth scenario increased feed prices so that the milk/feed price ratio is equal to 1.38, the usual long-term relationship between feed and milk prices. The milk price in this scenario is set equal to 70 percent of parity.

The flat milk price at 70 percent of parity affects prices differently in different regions. It assumes that the farm price for milk used as a fluid beverage would fall to the manufacturing milk in all states where milk production exceed fluid consumption by at least 25 percent.^{6/} Florida is the only state of the ten considered in this report where milk production does not exceed fluid consumption by more than 25 percent. Therefore, the farm milk price in Florida is assumed to reflect transportation cost of \$1.40 cwt to haul milk from surplus areas. Florida producers would be expected to receive this transportation difference because of their favorable location.

^{6/} Fallert, Richard F. and Boyd M. Buxton. Alternative Pricing Policies for Class I Milk Under Federal Marketing Orders - Their Economic Impact. U.S. Department of Agriculture, Economics, Statistics and Cooperatives Service. Ag Econ Report No. 401. May 1978.

Results of Long-Term Analysis

Relative rate of return

Given the conditions under the base scenario, costs and returns for the twenty-two dairy operations are reported in Appendix B. The rate of return ranged from -2.15 percent on the 52-cow New York dairy to about 15.72 percent on the 1,436-cow Florida and 900-cow New Mexico dairies (Table 6). The differences are due mostly to herd size as illustrated in Figure 3. The differences between New Mexico, Arizona and Florida (relatively high return), and California (relatively low return) in part reflect differences in milk prices.

The rate of return for the 600-cow New York dairy was favorable compared to herds of similar sizes in other states. The differences between the 600-cow Florida, 600-cow New York, 550-cow California and the 550-cow Idaho dairies are in part related to differences in milk price.

Given a long-term market clearing price of 70 percent of parity, the expected rate of return on all dairies would improve. However, the rate of return on the 125-cow Minnesota dairy would only increase from 2.05 to 2.63 percent while on the 900-cow New Mexico dairy it would increase from 15.63 to 17.99 percent. Generally the larger the dairies the greater the absolute increase in the rate of return for a 70 percent of milk parity price level than for the 1982 base milk price.

Eliminating classified pricing under federal milk orders (not eliminating orders themselves) likely would tend to equalize the price received by producers in all states (Scenario II). The economic implications of this policy has a differential impact depending on region. The rate of return would be about five per-

Table 6. Comparison of selected policy scenarios on the expected rate of return to investment for alternative size dairy farms in five regions.^{1/}

Region/State	Herd Size	Alternative Scenarios					IV	V
		Base	I	II	III	percent		
<u>Midwest States</u>								
Minnesota	52	-1.49	-0.89	-1.25	-1.77	0.66	-0.89	
Minnesota	125	2.05	2.63	2.20	1.58	4.51	2.63	
<u>Northeast</u>								
Pennsylvania	52	-1.72	-0.66	-2.21	-1.69	1.13	-0.07	
Pennsylvania	125	2.57	3.25	1.39	2.01	5.39	3.94	
Pennsylvania	200	4.26	5.02	2.94	3.63	7.42	5.80	
New York	52	-2.15	-1.58	-2.82	-2.63	-0.22	-2.17	
New York	200	3.18	3.95	2.29	2.54	5.79	3.15	
New York	600	7.43	8.37	6.34	6.66	10.62	7.40	
<u>South</u>								
Georgia	200	3.01	3.64	0.88	2.31	6.62	2.19	
Georgia	350	5.04	5.99	2.62	4.25	9.15	4.10	
Florida	350	7.46	9.14	1.89	6.08	16.08	3.18	
Florida	600	9.57	11.36	3.63	8.09	18.75	5.01	
Florida	1,436	15.72	17.70	9.13	14.08	25.91	10.66	
<u>Southwest</u>								
New Mexico	900	15.63	17.99	10.82	13.69	21.87	13.54	
Arizona	359	8.36	10.04	5.77	6.99	12.73	6.70	
Arizona	834	11.79	13.62	8.96	10.28	16.56	9.97	
Arizona	1,436	14.28	16.22	11.26	12.67	19.35	12.34	
California	550	6.58	8.32	6.54	5.14	12.33	4.86	
California	1,436	10.94	12.90	10.91	9.33	17.35	9.02	
<u>Northwest</u>								
Idaho	200	4.08	5.03	4.84	3.30	7.54	3.88	
Idaho	550	5.08	7.29	6.85	3.26	13.15	3.75	
Washington	140	4.01	5.25	3.55	2.99	6.92	3.19	

Policy scenarios are:

Base - 1982 prices and construction costs.

I - Long-term milk price of 70 percent of parity, 1982.

II - Long-term milk price of 70 percent of parity, but flat pricing in all regions.

III - Long-term milk price of 65 percent of parity.

IV - Milk production per cow equal to top 20 percent of Dairy Herd Improvement Association Producers, 1982.

V - Long-term milk price of 70 percent of parity but with higher feed prices to reflect a milk/feed price ratio of 1.38.

Percent

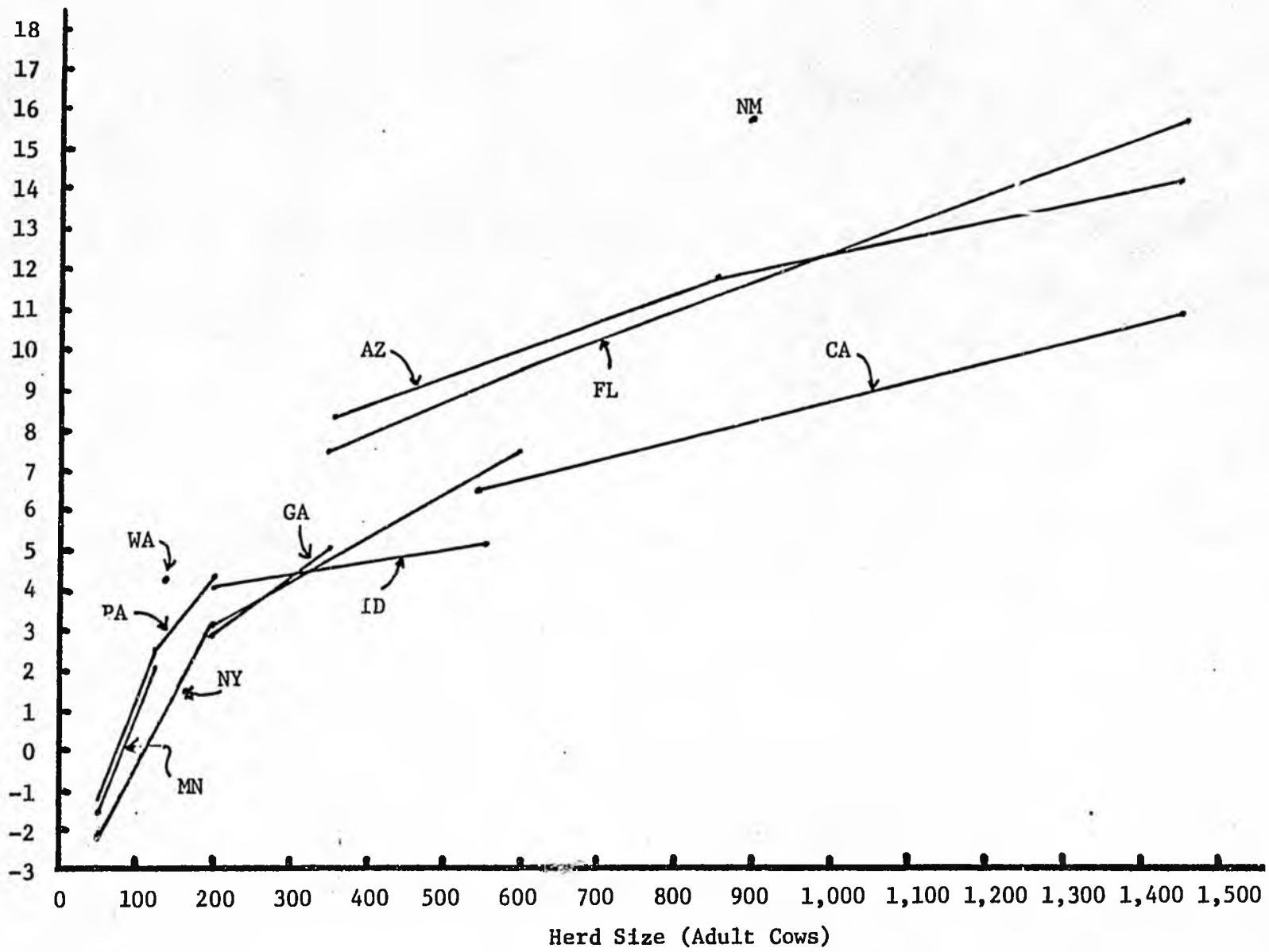


Figure 3. Long-term rate of return to investment by herd size and state.

centage points lower on the 900-cow New Mexico dairy and the 1,436 Florida dairy and three percentage points lower on the 1,436-cow Arizona dairy. These are areas where the decrease in milk price would be relatively large. The rate of return would be reduced about one percentage point in the Northeast and Northwest regions but basically unaffected in the Lake States.

A sixty-five percent of parity long-term milk price would be somewhat less favorable than existed in 1982 (Scenario III). The rate of return would be less favorable than under the base 1982 conditions.

Dairy producers who are able to achieve a level of milk production per cow equal to the top 20 percent of the producers using the Dairy Herd Improvement Association testing program would greatly improve their expected rate-of-return (Scenario IV). The rate of return would increase as much as 10 percentage points for a 1,436-cow Florida dairy (Table 6). The level of milk production per cow and concentrates fed per cow are shown in Table 7.

Using the long-term 70 percent of parity milkprice and a corresponding level of feed prices that reflect the long term milk/feed price ratio of 1.38 (Scenario V), reduces the rate of return in the Southeast, Southwest and Northwest regions relative to the Lake States and Northeast regions (Table 6). The rate of return is lower by about 7 percentage points for the 1,436-cow Florida dairy, 4 percentage points for the 1,436-cow Arizona and California dairies but nearly unaffected for the Lake States and Northeast dairies. The biggest impacts are for those dairies that purchase a large part of the feed requirement.

Table 7. Concentrates fed and milk production per cow for top 20 percent of DHIA producers, 198^{a/}

State	Concentrates Fed	Milk Per Cow
Minnesota	5,563	17,726
Pennsylvania	5,979	18,322
New York	5,012	18,144
Washington	6,450	19,000
Idaho	5,945	18,177
Georgia	6,779	15,897
Florida	11,019	15,897
New Mexico	6,927	18,169
Arizona	7,501	18,659
California	7,506	19,145

a/ Forage fed is the same as in base (see Table 3).

Adjusted cost per cwt

A cost per cwt of milk (adjusted for sales other than milk) tended to be lower on large than on small dairies in all states (Figure 4). Also costs were lower on the very large dairies in California, New Mexico, Arizona, and Idaho than on smaller dairies in Minnesota, Pennsylvania, and New York. However, the 600-cow New York dairy had comparable costs to herds of about that size in other states.

The major exception was the relatively high cost for Florida dairies. Floridas' high costs are in part offset by relatively high milk prices resulting in the competitive rate of return on investment discussed in the previous section and illustrated in Figure 3.

The cost per cwt of milk is nearly the same for alternative price support or federal order policy scenarios. However, costs per cwt drop dramatically for producers achieving milk production per cow equal to the top 20 percent of producers using DHIA tests compared to a producer achieving the average of all producers using DHIA tests (Table 8).

Conclusions of long-term analysis

A rate of return to investment is calculated for twenty-two dairy farms after all operating costs are paid and sufficient money withheld to maintain the long-term viability by replacing worn out equipment and facilities. The major findings of the analysis include the following:

1. Investment per cow in dairy buildings and equipment is less on larger than on smaller dairies.

2. For the herd sizes that characterizes dairy farming in each region, investment per cow is less for the large dairy operations in the Southwest, Northwest and Southeast than for the Lake State and Northeast regions.

Cost/cwt./Milk

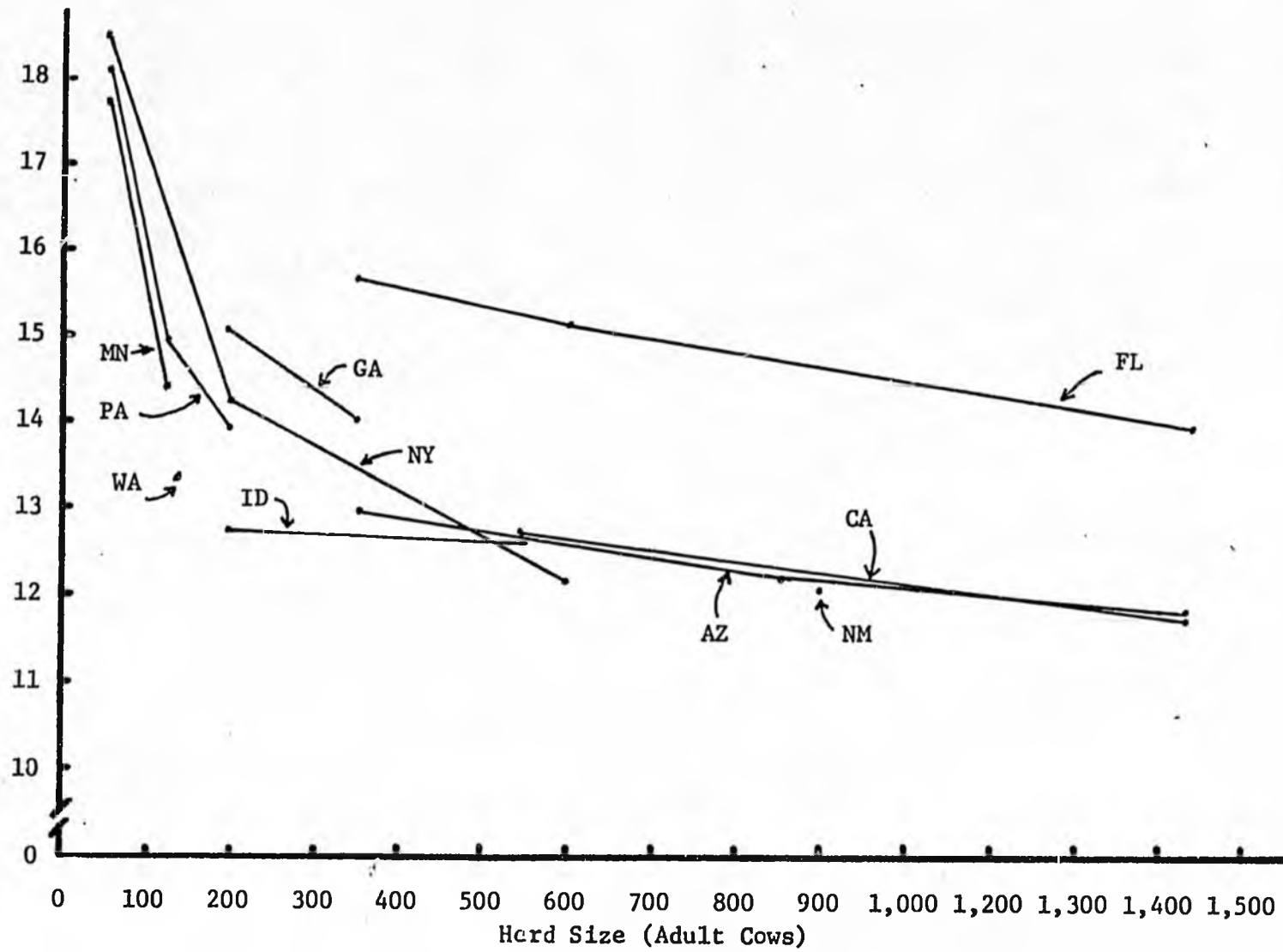


Figure 4. Total cost per cwt. of milk by herd size and state, 1982.

3. Based on whole farm budgets, the larger dairies with 500 cows or more are more profitable than smaller dairies. Considering the long-term, effeciently operated dairies in New Mexico, Arizona and Florida are more profitable than their counterparts in California, Idaho, Minnesota and the Northeast. This result is the bottom line after reflecting regional difference in costs and milk prices received.

4. Although costs per cwt of milk are highest in Florida, the relative high price received for milk provides a competitive return. The profitability of California and Idaho dairies is adversely affected by lower milk prices compared to New Mexico, Arizona and Florida dairies.

5. Strong economic pressure exists for herds to get larger in all regions. This will continue the trend to fewer and larger dairies.

6. The relatively favorable profit potential (rate of return) of large scale dairy farming in the Southwest, Southeast and Northwest regions will likely result, over the long term, in a continued shift in milk production to those areas. Those areas will likely increase their relative share of total U.S. milk production, placing increased competitive pressure on the traditional Lake States and Northeast dairy areas.

7. The profitability of dairy farming is greatly improved in all regions when management achieves production per cow levels equal to the top 20 percent of the farmers using Dairy Herd Improvement Testing programs (Scenario V). Achieving these performance levels tends to improve the profitability of large more than small dairies, adding more economic incentive for large scale dairying.

Table 8. Impact of higher milk production per cow on adjusted cost per cwt.

Region/State	: Herd : Size	: Base	: Top : 20%
	(cows)	- - - - -	dollars - - - - -
<u>Lake States</u>			
Minnesota	52	17.71	15.46
Minnesota	125	14.43	12.66
<u>Northeast</u>			
Pennsylvania	52	18.09	15.89
Pennsylvania	125	14.97	13.24
Pennsylvania	200	13.92	12.35
New York	52	18.46	16.54
New York	200	14.25	12.86
New York	600	12.20	11.06
<u>Southeast</u>			
Georgia	200	15.04	13.30
Georgia	350	14.06	12.48
Florida	350	15.65	13.80
Florida	600	15.19	13.41
Florida	1,436	13.93	12.35
<u>Southwest</u>			
New Mexico	900	12.06	11.19
Arizona	359	12.98	12.02
Arizona	834	12.26	11.37
Arizona	1,436	11.81	10.96
California	550	12.68	11.46
California	1,436	11.77	10.68
<u>Northwest</u>			
Washington	140	13.38	12.42
Idaho	200	12.75	11.35
Idaho	550	12.63	12.25

8. Retaining milk marketing orders but realigning the level of class I fluid milk prices (Scenario II) to be the same (flat) in all areas with surplus fluid milk, would adversely effect profitability in the Southeast, Southwest, Northwest and Northeast relative to the Lake States.

TEN YEAR IMPACT OF ALTERNATIVE POLICIES

The preceding section considered the long-term relative rates of returns of different size dairies in five regions. Implicit in the analysis is that the support price cannot be permanently above or below the price level that will balance supply and demand. Under the present purchase type price support program, decisions to set support prices above the long-term market clearing level would, in the long-run, have to be modified. Otherwise the government expenditures would grow to a level unacceptable to policymakers. This means that alternative support levels are only relevant to a relatively short period of time and must, in the longer-run, be adjusted to reflect market conditions.

This section considers the economic impacts of selected short-run policy decisions on dairy operations over a ten year period. It is short-run in the sense that it focuses on the impact of alternative policies on specific dairy operations without fully recognizing the long-term market and industry adjustments that the alternative policies would cause. However, some insights about likely industry adjustments can be obtained by considering the impact of policies on specific dairies. Eight of the twenty-two dairy operations analyzed in the previous section were selected to analyze the impact of alternative policies. Only three of the five regions are represented.

The likelihood of a particular dairy remaining solvent under alternative policies is directly affected by its financial characteristics. The characteristics of most importance include the value of assets, cash reserves, debt, net worth, equity and family consumption needs. A policy change can have quite different implications for the operator of a dairy with a high level of debt than one with a low level of debt.

The average financial situation that exists on the eight dairies of the size and location selected are shown in Table 9. The averages were approximated from a U.S. Department of Agriculture farm financial survey.^{7/} Equity ranged from 69 to 76 percent of total assets. In contrast to replacement values used in the previous section, the value of buildings and machinery are market values and assumes each asset is about half depreciated).

Dairy Simulation

A Firm Level Income Tax and Farm Policy Simulation was used to simulate the eight dairy operations for selected policy and technology scenarios. A detail description of the simulator is contained in Appendix C. Each dairy operation was simulated recursively over a 10-year planning horizon beginning in 1983. The entire planning horizon was simulated 50 times (iterations) using a different set of random milk, cull cow and replacement cow prices, feed costs and milk production per cow for each iteration. At the end of each iteration, values for present value of net returns (revenue minus cost over ten year period) and ending net worth, long-term and intermediate-term debt, equity to asset ratio, internal rate of return

^{7/} Summary of financial characteristics of dairy farms provided by ERS, USDA.

Table 9. Financial characteristics assumed for eight dairy operations in four states.

Financial Characteristics	Minnesota		AZ	California		Florida		
	52	125	359	550	1,436	350	600	1,436
Value of								
Cropland and Farmstead (\$1,000)	293.4	679.1	39.4	160.0	312.0	262.5	450.0	1,074.0
Buildings (\$1,000)	92.7	176.7	192.8	284.4	512.6	87.9	108.9	211.7
Farm Machinery (\$1,000)	104.1	159.0	120.3	183.1	303.0	114.6	180.0	260.7
All Livestock (\$1,000)	77.9	181.4	599.6	960.7	2,505.0	525.5	981.4	2,344.3
Off Farm Investments (\$1,000)	5.5	13.1	0	0	0	0	0	0
Beginning Cash Reserves (\$1,000)	12.0	62.5	89.8	137.5	35.9	70.0	212.0	505.5
Debt								
Long-Term (\$1,000)	111.2	213.9	67.3	155.5	288.6	143.7	218.0	475.7
Intermediate-Term (\$1,000)	57.1	88.5	230.4	308.8	842.4	160.0	243.9	468.9
Initial Networth (\$1,000)	417.1	969.4	744.2	1,261.3	2,537.5	756.9	1,464.7	3,343.0
Equity Ratio (Fraction)	.71	.76	.71	.73	.69	.71	.76	.76
Family Living								
Minimum (\$1,000)	20.0	25.0	25	27	30	25	27	30
Maximum (\$1,000)	32.0	35.0	30	38	40	30	38	40
Marginal Propensity (Fraction)	.3	.4	.3	.4	.4	.35	.4	.4
Off Farm Income (\$1,000)	0	0	0	0	0	0	0	0

and net farm income were calculated. The 50 iterations provided empirical probability distributions associated with these calculated variables.

variables, discussed later, were used as the criterion for comparing the economic impact of alternative policy and technology scenarios. In addition a probability that the dairy will remain solvent for 10 years (probability of survival) and the probability that the dairy will have a positive after-tax net present value are calculated.

All prices for the ten year simulation are in constant 1983 dollars. The base scenario assumes the support price specified in the Dairy and Tobacco Production and Stabilization Act of 1983. The 1984 price likely will be 32 cents lower than 1983 reflecting a 50 cent reduction in the support price on December 1 of 1983. The government purchases of surplus dairy products are assumed to be high enough through 1985 and 1986 to trigger a 50 cent drop in support price on April 1, 1985, and again on July 1, 1985, as specified in the above mentioned Act of 1983.

All features of the Act of 1983 are scheduled to expire on September 30, 1985. It is assumed in the base scenario that the support price will remain at the 1985 level through 1986 then reflect a long-term market clearing level of \$13.11 for manufacturing milk (70 percent of parity) through 1992, the end of the ten year period. The prices in Table 5 are "all" milk prices by states corresponding to the assumed support price for manufacturing grade milk.

The base prices are supported by the support price. Therefore, they have zero probability of being lower. To evaluate a no dairy price support scenario, the prices used in the base are retained (reflecting the long-

term market clearing price).^{8/} However, with no price support program, the actual price may be either above or below the base price. The simulator randomly selects milk prices from may be as much as 20 percent above or 25 percent below the mean price. Therefore, the difference between the base and no dairy program scenarios is in the differences in milk price variability expected and not in differences in the overall level of milk prices.

Stochastic Variables - In addition to the milk price, the prices of cull cows, replacement heifers, and feed, and production per cow are assumed to be stochastic over the ten year period. Random values for these variables are drawn from an estimated multivariate empirical probability distribution. The correlation matrix on which the multivariate distribution is based is shown in Table 10.

The base prices used were \$488.80 per cull cow and \$1210 per replacement heifer. Milk production per cow followed the 1973 to 1982 trend which varies some by states (Table 11).

Non-Stochastic Variables - Interest rates used in the simulation model were:

Old long-term loans -----	8.5	percent
Old intermediate loans -----	13.0	percent
New long-term loans -----	11.5	percent
New intermediate loans -----	13.26	percent
Refinance long-term loans ----	13.00	percent
Refinance intermediate loans -	13.26	percent
Operating loans -----	10.0	percent
Received for cash reserves ---	10.0	percent

^{8/} The variation of milk prices without a dairy price support program was developed from the following study: Thraen, Cameron S. and Jerome W. Hammond. Price Supports, Risk Aversion and U.S. Dairy: An Alternative Perspective of the Long-Term Impacts. Economic Report ER83-9, Department of Agricultural and Applied Economics, University of Minnesota. June 1983.

Table 10. Correlation between stochastic variables used in the dairy simulations.

Region/Variable	Milk Price	Cull Cow Price	Replacement Cow Price	Milk/Cow	Feed Cost
<u>Lake States</u>					
Milk price	1.000	.887	.594	.403	-.435
Cull cow price		1.000	.777	.277	-.302
Replacement cow price			1.000	.3137	.234
Milk/cow				1.000	-.464
Feed price					1.000
<u>Southeast</u>					
Milk price	1.000	.202	.461	.401	.836
Cull cow price		1.000	-.807	-.040	-.221
Replacement cow price			1.000	-.197	.222
Milk/cow				1.000	.068
Feed price					1.000
<u>Southwest</u>					
Milk price	1.000	-.162	-.067	-.549	.004
Cull cow price		1.000	.963	.407	-.206
Replacement cow			1.000	.187	-.169
Milk/cow				1.000	-.328
Feed price					1.000

Table 11. Milk prices and milk production per cow used in ten year base scenario simulation.

Item/Year	State			
	:Minn.	: Arizona	: Calif.	: Florida
<u>Milk price</u>	- - - - - dollars per cwt - - - - -			
1983	12.94	13.90	13.06	16.50
1984	12.62	13.54	12.98	16.14
1985	12.38	13.30	12.74	15.90
1986	12.38	13.30	12.74	15.90
1987	13.38	14.30	13.74	16.90
1988	13.38	14.30	13.74	16.90
1989	13.38	14.30	13.74	16.90
1990	13.38	14.30	13.74	16.90
1991	13.38	14.30	13.74	16.90
1992	13.38	14.30	13.74	16.90
<u>Milk production per cow</u>	- - - - - hundred weights - - - - -			
1983	147.6	165.7	163.7	131.5
1984	149.3	168.2	166.2	133.4
1985	151.0	170.7	168.7	135.3
1986	152.7	173.2	171.2	137.2
1987	154.4	175.7	173.7	139.1
1988	156.1	178.2	176.2	141.0
1989	157.8	180.7	178.7	142.9
1990	159.5	183.2	181.2	144.9
1991	161.2	185.7	183.7	146.9
1992	162.9	188.2	186.2	148.6

Zero inflation rate was also assumed over the ten year planning horizon (all prices in 1983 dollars).

The dairies are not allowed to increase herd size over the ten year period. The crop mix on dairies producing some or all the feed is assumed to be constant.

Policy and Technology Scenarios

The eight dairy operations in three regions were simulated for 10 years under the alternative scenarios described below. Seven policy scenarios (excluding the 1983 base described in a previous section) and two technology scenarios were simulated for each dairy. The assumptions and policy values associated with each scenario were held constant across all dairies to allow direct comparison of their impacts on different size dairies in different regions.

Two financial bailout scenarios (interest subsidy and debt restructuring) were evaluated for the Minnesota 52-cow and 125-cow, Arizona 359-cow and Florida 350-cow dairies assuming an initial high debt position and assuming a new entrant with high debt position. Each scenario is described in this section.

Policy Scenario

Base--The base scenario assumes the continuation of the Dairy and Tobacco Production Stabilization Act of 1983 followed, after expiration on September 30, 1985, with a 70 percent of parity milk price.

The following options for depreciating machinery and calculating income taxes are used for the base scenario.

* Machinery, livestock, and buildings placed in use prior to 1981 are depreciated using the double declining balance method.

- * Machinery, livestock, and buildings placed in use after 1980 are depreciated using an accelerated cost recovery method.
- * The operator elects to claim first year expensing for all depreciable items placed into use after 1980.
- * The operator elects to take maximum investment tax credit (ITC) and thus reduce the basis for all depreciable assets placed into service after 1980.
- * The operator may use either the regular income tax computation or income averaging to calculate federal income tax liabilities.
- * There is no maximum interest deduction under the federal income tax codes.
- * The actual self employment tax rates and maximum income levels subject to this tax for 1983 and 1984 are used. Announced values for these variables in 1985-1986 were used and the 1986 values were held constant through 1992.
- * The operator elects to trade obsolete machinery in on new replacements.

A 20% acreage reduction--The present feed grain program was assumed through 1985. From 1986 to 1992 a 15% set aside with a 5% diversion for corn, cotton, rice, sorghum, and wheat was assumed. Normal slippage (30% for corn and 70% for all other crops) and program participation rates were used to estimate the resulting real increase in mean prices for these crops from 1986 to 1992. This program results in dairy feed prices being 9 percent higher than under the base scenario.

An effective 20% acreage reduction--This is the same as above except slippage was set equal to zero for 1986 to 1992. And program participation

rates were assumed to be 80 percent of normal calculating the real increase in mean prices for these crops from 1986 to 1992. This program results in dairy feed prices being 11 percent higher than under the base scenario.

No crop program--The CCC loan, farmer owned reserve, and target price provisions were eliminated for all years in the planning horizon (1983-1992). This increased the variability in feed costs facing dairy operations. The impact of this increased variability is evaluated.

Fifty cents lower price--All the assumptions of the base scenario are retained except the mean milk prices are reduced 50 cents per cwt and the variability of milk price increased.

No dairy program--All assumptions of the base scenario are retained except milk price variability was increased. Milk prices have a ten percent chance of being 20 percent higher or 25 percent lower than the base mean price. The mean prices are kept the same as in the base scenario. The simulation results show the impact of increased variability in milk prices.

Income tax changes--All assumptions of the base scenario are retained except for more restrictive federal income tax provisions including:

- * Machinery, livestock, and buildings were depreciated using the straight line cost recovery method.
- * First year expensing provisions were eliminated for all depreciable items.
- * Maximum Investment Tax Credit provisions were eliminated.
- * The maximum annual interest expense which could be used to reduce taxable income was \$15,600.

* The operator must sell obsolete machinery upon disposition rather than trading it in on new replacements, thus forcing recapture of excess depreciation deductions.

Supply control--All assumptions of the base scenario are retained except mandatory quotas are imposed on dairies. Quotas equal to 96.5 percent of a producers normal production would, over time, be expected to maintain milk prices \$1 above those in the base scenario. Cow numbers would be reduced about 4 percent in order to reduce milk production 3.5 percent assuming poorer than average cows would be culled in complying with the quota.

Technology scenarios

Computer feeding--A technology now available but not widely adopted is individual cow feeding by using computer controlled feed stalls. Concentrates fed to individual cows can be controlled in total and over time. One experiment suggests that average daily milk production per cow can be increased two pounds with a .1 percent higher butterfat content without increasing total feed fed to the herd.^{9/} The estimated added investment cost for computer feeding for the eight dairies are:

Minnesota 52-cow herd	\$11,960
Minnesota 125-cow herd	\$18,750
Florida 350-cow herd	\$43,400
Florida 600-cow herd	\$71,400
Florida 1,436-cow herd	\$157,960
Arizona 359-cow herd	\$44,516
California 550-cow herd	\$66,000
California 1,436-cow herd	\$157,900

^{9/} Wildhaber, Greg, Gayle Willet, and Joe Hillers. Can You Justify A Computerized Grain Feeder? Hoards Dairyman Magazine. March 25, 1984. p. 389.

Investment includes a neck responder for each cow, feeder stall with storage and auger feeder, and a computer.

All assumptions of the base are retained except the 17 cent per cwt higher milk price (butterfat differential payment for 0.1 percent higher fat content), added investment and operating costs, and higher average milk production per cow.

Growth hormone--A technology not yet in commercial use but demonstrated in experimental work is bovine growth hormone. Milk cows are injected with the hormone every other day resulting in increased milk production. Preliminary results are that milk production per cow during the last two-thirds of the lactation is increased 30 to 40 percent without additional feed (about 23 percent annually). The cost for the hormone can be expected to decline as it probably can be relatively cheaply produced. Every other day injections costing \$1 each are assumed in this analysis. Combining this cost with increased hauling and other costs of added milk results in about \$185 increase in cost per cow per year. All other assumptions in the base are retained.

Financial stress scenarios

Base financial stress scenario--The assumed beginning financial conditions for four of the eight dairies were changed to reflect high debt operators and new entrants with high debt operators (Table 12). Debt load was about doubled to reflect high debt situations. For new entrants all equipment is assumed to be new which increases both the initial value of machinery and the total debt load.

Two policies are considered for high debt dairies. One is to subsidize interest rates on all debt so the effective rate for all

loans paid would be 8 percent rather than the higher rates used in the base. The second is to convert a portion of intermediate debt into long-term loans and/or to extend the length of intermediate-term loans. In the second case, interest rates, total debt loads, and other assumptions of the high debt dairies remain the same as in the base.

The impact of changes in crop programs (20 percent acreage reduction) resulting in nine percent higher feed prices and eliminating the dairy price support program is evaluated for new entrants with high debt position.

Evaluation Criteria

The FLIPSIM V model provides considerable detail as to the viability of a representative farm at the end of each iteration, e.g., leverage ratio, net worth, total assets, total debt, net present value, and whether the dairy remained solvent for 10 years. By repeating each scenario for 50 iterations, the model generates the information necessary to estimate the probability distributions for key output variables. The means of these key output distributions are used to compare the economic impacts of selected policy and technology scenarios on specific dairies. The following output variables for the model were selected to compare the impacts of the scenarios described in the previous section.

- * Probability of survival is defined as the probability that the representative farm will remain solvent for 10 years. In other words, it is the probability that the farm operator would maintain at least the minimum financial ratios required by bankers in the local area for all years of the 10 year planning horizon.

Table 12. Percentage change in initial financial position to reflect dairies in initial high debt and for new entrants with high debt positions.

Financial Characteristic	Herd Size							
	High Debt				New Entrant			
	MN	MN	AZ	FLA	MN	MN	AZ	FLA
	52	125	359	350	52	125	359	350
	----- percent change ^{a/} -----							
Value								
Cropland & Farmstead (\$1,000)	0	0	0	0	0	0	0	0
Buildings (\$1,000)	0	0	0	0	0	0	0	0
Farm Machinery (\$1,000)	0	0	0	0	138	168	167	209
All Livestock (\$1,000)	0	0	0	0	0	0	0	0
Off Farm Investments (\$1,000)	0	0	0	0	0	0	0	0
Beginning Cash Reserves (\$1,000)	0	0	0	0	0	0	0	0
Debt								
Long-Term (\$1,000)	108	148	107	46	143	180	141	71
Intermediate-Term (\$1,000)	91	131	88	140	242	311	139	230
Initial Worth (\$1,000)	-41	-43	-42	-38	-37	-41	-29	-30
Equity Ratio (Fraction)	1	-42	-37	8	-49	-51	-41	-42
Family Living								
Minimum (\$1,000)	0	0	0	0	0	0	0	0
Maximum (\$1,000)	0	0	0	0	0	0	0	0
Marginal Propensity (Fraction)	0	0	0	0	0	0	0	0
Off Farm Income	0	0	0	0	0	0	0	0

^{a/} Change from initial values shown in Table 9.

- * Probability of a positive after-tax net present value. An after-tax, real discount rate of 3% was used to calculate the farm's net present value. Thus this statistic indicates the probability of the representative farm providing at least a 3% real rate of return on the initial investment.
- * After-tax net present value is the net present value of the operator's annual cash withdrawals plus the present value of the change in net worth for the total operation minus the present value of annual off-farm income. A 3% after-tax, real discount rate was used to calculate net present value for all representative dairies.
- * Present value of ending net worth measures the present value of the financial growth for a dairy over the 10 year planning horizon. Net worth is affected by increases or decreases in asset (land, machinery, and livestock) value and retained earnings. This value can be compared directly to each dairy's initial net worth (Table 9) to indicate the relative magnitude of financial growth.
- * Total long- and intermediate-term debts at the end of the planning horizon are recorded for each iteration. These values provide an insight into the financial stress of the dairy over the planning horizon. Increases in average ending debt from one scenario to another can be due to the dairy operator being forced to refinance large cash flow deficits. When surplus cash is available, the operator is permitted to prepay intermediate-term debts. Therefore, large ending intermediate-term debts are an

indication that there were insufficient cash reserves to reduce intermediate-term debt through prepayment of principal.

- * Ending equity ratio is the ratio of ending net worth to ending assets for each iteration. This ratio provides a measure for comparing the representative dairies ending financial position across scenarios.
- * Internal rate of return for the representative dairy is calculated at the end of each iteration. The internal rate of return is the real discount rate which makes the present value of the operator's annual cash withdrawals and change in net worth equal zero.

Results for Alternative Policy and Technology Scenarios

52-cow Minnesota dairy

Given the base policy scenario, the 52-cow Minnesota dairy had a 98 percent chance for survival after ten years but only a 46 percent chance of having an after tax, net present value (Table 13). The after tax net present value averaged \$29,000 with a standard deviation of \$133,000. Average present value of ending net worth decreased from the initial \$417,000 to \$320,000 after ten years. Although intermediate-term debt declined \$19,000, long-term debt increase \$115,000 or more than doubled. The equity to asset ratio declined from 0.71 to 0.60 over the ten year period. Average annual net farm income was a negative \$13,000.

All three policy alternatives involving crop programs that increase feed prices (Scenarios I and II) and the no crop program that increases feed price variability (Scenario III) have little impact on the 52-cow Minnesota dairy because most of the feed is raised rather than purchased

Table 13. Comparison of selected policy scenarios on a 52-cow Minnesota dairy.

Criteria	: Initial : Situation :	: Base :	Alternative Scenarios								
			: I	: II	: III	: IV	: V	: VI	: VII	: VIII	: IX
Probability of Survival (percent)	NA	98	98	98	98	94	90	98	100	98	100
Probability of positive after tax net present value (percent)	NA	46	46	46	46	38	38	46	76	50	94
After-tax net present value mean (\$1,000)	NA	29	28	28	30	5	6	24	91	39	159
std. dev. (\$1,000)	NA	133	133	133	133	136	158	132	131	136	138
Present value of ending net worth (\$1,000)	417	320	319	319	320	296	298	312	376	336	438
Total long-term debts after 10-years (\$1,000)	111	226	227	227	226	241	234	232	172	220	111
Total intermediate-term debt after 10 years (\$1,000)	57	36	40	37	37	44	52	36	22	35	9
Total equity to assets after 10-years (fraction)	.71	.60	.60	.60	.60	.56	.55	.59	.71	.62	.82
Internal rate of return after 10-years (fraction)	NA	.017	.017	.017	.017	.009	.004	.016	.033	.019	.046
Average annual net farm income (\$1,000)	NA	-13	-14	-14	-14	-16	-17	-14	-5	-13	1

a/ Scenarios are:

- Base - continuation of present policy through 1985 then milk price equal to 70 percent
- I - a 20% acreage reduction crop program - 9% higher feed costs
- II - an effective 20% acreage reduction crop program - 11% higher feed costs
- III - no crop program
- IV - fifty cent per cent lower milk price
- V - no dairy price support program
- VI - reduce income tax benefit program
- VII - milk supply control program
- VIII - computer feeding technology
- IX - bovine growth hormone technology

NA = not applicable.

on the Minnesota dairy. Crop yields were fixed and not variable from year-to-year. However, simulations where crop yields were stochastic did not significantly change the results.

A support price 50 cents below the price in the base scenario reduces the probability of survival from 98 percent to 94 percent (Scenario IV). The decline in the present value of ending net worth is more adversely affected and debt is higher compared to the base.

Eliminating the price stabilizing aspects of the dairy price support program (Scenario V) would result in a probability of survival of 90 percent for the 52-cow Minnesota dairy compared to 98 percent under the base scenario. The equality to asset ratio would be .55 after ten years compared to .60 after ten years under the base scenario.

Eliminating income tax benefits (Scenario VI) does not change the probability of survival but does adversely affect the present value of ending net worth and total debt when compared to the base.

A supply control program (Scenario VII) would increase the probability of survival to 100 percent and the equity to asset after ten years to remain equal to the initial .71. Present value of ending net worth declines from an initial value of \$117,000 to \$376,000 after ten years. Total debt increases. The supply control scenario generally is more favorable than base scenario for the 52-cow Minnesota dairy.

The computer feeding technology (Scenario VIII) has a positive impact on the 52-cow Minnesota dairy. Compared to the base scenario, the probability of a positive after-tax net present value increased from 46 to 50 percent. The present value of ending net worth is improved \$16,000 and the equity to asset ratio is .62 compared to .60 for the base.

Given the preliminary information about this technology, the bovine growth hormone technology would substantially improve the financial position of the 52-cow Minnesota dairy (Scenario IX). The probability of a positive after-tax net present value increased from 46 percent under the base scenario to 94 percent if the bovine growth hormone technology were adopted. The present value of ending net worth after ten years is about \$21,000 higher than the initial \$417,000. Total equity to assets ratio increases from an initial .71 to .82 after the ten year period.

125-cow Minnesota dairy

Given the base policy scenario, the 125-cow Minnesota dairy had a 100 percent chance of surviving ten years and a 96 percent chance of having a positive after-tax net present value (Table 14). The present value of ending net worth increased slightly from an initial \$969,000 to \$1,051,000 at the end of the ten year period. Both long-term and intermediate-term debt were reduced and the equity ratio increased from an initial 0.76 to 0.87 by the end of the ten years.

Like the 52-cow Minnesota dairy, policies that increase the level or variability of feed prices have little impact on the financial performance (Scenarios I, II, and III) which insulates it from short-run variation in feed cost. The 125-cow Minnesota dairy also produces most of its own feed requirement.

A 50 cents per cwt lower support price would reduce the present value of ending net worth from \$1,051,000 under the base scenario to \$1,010,000 (Scenario IV). The total equity ratio would be 0.83 rather than 0.87 under the base. However, a ratio of 0.83 at the end of the ten year period still represents an improvement from the initial 0.76 ratio.

Table 14. Comparison of Selected Policy Scenarios on a 125-Cow Minnesota Dairy

Criteria	Initial Situation	Base	Alternative Scenario ^{a/}								
			I	II	III	IV	V	VI	VII	VIII	IX
Probability of Survival (Percent)	NA	100	100	100	100	100	100	100	100	100	100
Probability of Positive After-tax Net Present Value (Percent)	NA	94	94	94	94	90	82	92	98	98	100
After-tax Net Present Value Mean (\$1,000)	NA	315	313	313	314	266	276	295	416	343	626
Std. dev. (\$1,000)	NA	306	306	306	306	305	347	306	295	304	314
Present Value of Ending Net Worth (\$1,000)	969	1,051	1,050	1,049	1,050	1,010	1,003	995	1,136	1,096	1,277
Total Long-term Debts After 10-years (\$1,000)	214	175	176	177	175	215	227	225	88	148	15
Total Intermediate-term Debt After 10-years (\$1,000)	89	23	22	22	23	30	28	40	10	15	1
Total Equity to Assets After 10-years (fraction)	.76	.87	.86	.86	.86	.83	.82	.82	.93	.89	.97
Internal Rate of Return After 10-years (fraction)	NA	.042	.042	.042	.042	.038	.038	.041	.051	.044	.066
Average Annual Net Farm Income (\$1,000)	NA	7	7	7	7	1	2	0	20	11	47

^{a/} Scenarios are:

- Base - continuation of present policy through 1985 then milk price equal to 70 percent
- I - a 20% acreage reduction crop program - 9% higher feed costs
- II - an effective 20% acreage reduction crop program - 11% higher feed costs
- III - no crop program
- IV - fifty cent per cent lower milk price
- V - no dairy price support program
- VI - reduce income tax benefit program
- VII - milk supply control program
- VIII - computer feeding technology
- IX - bovine growth hormone technology

NA = not applicable.

No dairy support program (Scenario V) would reduce the probability of a positive after-tax present value to 82 percent compared to 94 percent under the base scenario. Both long-term and intermediate-term debt would be higher after ten years than after ten years under the base scenario. The dairy would be able to improve the equity to asset ratio compared to the initial 0.76 but the improvement would be less than 0.87 ratio under the base scenario.

Eliminating the income tax benefits (Scenario VI) for the 125-cow Minnesota dairy would result in higher debts, lower present value of ending net worth, equity ratio and average annual net farm income than after ten years under the base scenario.

A supply control program (Scenario VII) would increase the probability of a positive after-tax net present value to 98 percent compared to 94 percent under the base scenario. Under both the base and supply control scenarios, the 125-cow dairy had a 100 percent chance of surviving the ten year period. The dairy showed good financial progress under the supply control program as the present value of ending net worth was \$1,136,000 compared to an initial net worth of \$969,000. The total equity ratio was .93 at the end of the ten year period compared to the .76 ratio at the beginning of the period. Average annual net farm income for the 10 year period was \$20,000.

Both the computer feeding and growth hormone technologies showed substantial improvement compared to the base scenario (Scenario VIII and IX). Present value of ending net worth was \$1,096,000 for computer feeding and \$1,278,000 for growth hormone compared to an initial \$969,000 at the beginning of the ten year period. Total equity to asset ratio for the

growth hormone technology was 0.97 after ten years compared to 0.76 at the beginning of the period and average annual net farm income was \$47,000.

359-cow Arizona dairy

Given the base policy scenario, the 359-cow Arizona dairy had a 98 percent chance of survival and a 98 percent change of a positive after-tax net present value for the ten year period (Table 15). The dairy showed good financial improvement over the ten years as present value of ending net worth was \$1,628,000 compared to \$744,000 at the beginning of the period, most debt was paid and total equity ratio increased from 0.71 to 0.94. Average annual net farm income was \$78,000.

All feed is purchased by the 359-cow Arizona dairy and the 9 percent increase in feed cost (Scenario I) reduced the probability of survival to 88 percent and the 11 percent increase in feed costs (Scenario II) reduced the probability of survival to 84 percent compared to 98 percent under the base scenario. However, the dairy still made good financial progress with 11 percent higher feed costs as debts were more than cut in half and the present value of ending net worth was \$1,162,000 compared to the initial \$744,000 at the beginning of the period. No crop programs (Scenario III) increased the variability of feed prices but reduce the financial progress of the dairy relatively little compared to the base.

A support price 50 cents below the base scenario (Scenario IV) prices did not change the probability of survival compared to the base but did result in a lower present value of ending net worth and lower average annual net farm income. Total equity to asset ratio still increased to 0.94, the same as under the base scenario.

Table 15. Comparison of Selected Policy Scenarios on a 359-Cow Arizona Dairy Farm

Criteria	Initial :		Alternative Scenario ^{a/}								
	Situation:	Base :	I :	II :	III :	IV :	V :	VI :	VII :	VIII :	IX :
Probability of Survival (Percent)	NA	98	88	84	98	98	96	98	100	98	100
Probability of Positive After tax Net Present Value (Percent)	NA	98	88	84	98	98	96	98	100	98	100
After-tax Net Present Value											
Mean (\$1,000)	NA	1,402	828	715	1,397	1,250	1,196	1,377	1,676	1,499	2,742
Std. dev. (\$1,000)		489	647	658	498	453	558	490	416	504	491
Present Value of Ending Net Worth (\$1,000)	744	1,628	1,235	1,162	1,624	1,543	1,506	1,533	1,754	1,708	2,320
Total Long-term debts											
After 10-years (\$1,000)	67	3	24	24	3	3	6	3	0	3	0
Total Intermediate-Term Debt											
After 10-years (\$1,000)	230	9	65	75	10	9	23	9	0	10	0
Total Equity to Assets											
After 10-years (fraction)	.71	.94	.85	.82	.94	.94	.91	.94	.94	.93	.93
Internal Rate of Return											
After 10-years (fraction)	NA	.15	.083	.054	.137	.134	.092	.143	.163	.142	.208
Average Annual Net Farm Income (\$1,000)	NA	78	12	-3	77	61	52	81	109	90	220

- ^{a/} Scenarios are:
- Base - continuation of present policy through 1985 then milk price equal to 70 percent
 - I - a 20% acreage reduction crop program - 9% higher feed costs
 - II - an effective 20% acreage reduction crop program - 11% higher feed costs
 - III - no crop program
 - IV - fifty cent per cent lower milk price
 - V - no dairy price support program
 - VI - reduce income tax benefit program
 - VII - milk supply control program
 - VIII - computer feeding technology
 - IX - bovine growth hormone technology

NA = not applicable.

Eliminating the dairy support program (Scenario V) reduced the probability of survival to 96 percent compared to 98 percent under the base scenario. The after-tax net present value was \$1,196,000, \$206,000 less than under the base scenario, but its standard deviation increased from \$489,000 to \$558,000. The present value of ending net worth was \$122,000 less than under the base but still more than doubled from \$744,000 at the beginning of the period. Most debt was retired and the total equity to asset ratio increased from 0.71 at the beginning of the period to 0.91 at the end of the 10 years. Average annual net farm income was \$52,000 compared to \$78,000 under the base.

Eliminating income tax advantages (Scenario VI) slightly reduced the present value of ending net worth compared to the base scenario but had no affect on the probability of survival, remaining debt and ending total equity to asset ratio.

With supply control (Scenario VII) the probability of a positive after tax net present value was 100 percent compared to 98 percent under the base scenario. Present value of ending net worth was \$126,000 higher at the end of the ten year period compared to the base scenario. Average annual net farm income was \$109,000.

The computer feeding and bovine growth hormone technology scenarios had a favorable impact on the financial success of the 359-cow Arizona dairy (Scenarios VII and IX). Compared to the base the present value of ending net worth was \$80,000 higher with the computer feeding technology and \$692,000 higher with the growth hormone technology.

550-cow California dairy

Given the base policy scenario, the 550-cow California dairy had a 98 percent probability of a positive after-tax net present value (Table 16). The dairy showed good financial improvement over the 10 year period under the base scenario. Present value of ending net worth increased from \$1,261,000 at the beginning to \$2,278,000 at the end of the ten year period. Total debts were mostly paid off and total equity to asset ratio increased from 0.73 to 0.93 over the ten year period.

The acreage reduction policies (Scenarios I and II), resulting in increased feed costs, reduced the probability of survival from 98 percent under the base to 78 percent and the probability of positive after-tax net present value from 98 percent to 78 percent with 9 percent higher feed costs (Scenario I) and 76 percent with 11 percent higher feed costs (Scenario II).

No crop programs (Scenario III) had relatively little impact on the 550-cow California compared to the base scenario.

A milk support price 50 cents lower (Scenario IV) than under the base reduced the probability of survival from 98 percent to 94 percent and the present value of ending net worth from \$2,287,000 to \$2,72,000. The total equity to asset ratio after ten years was .90 compared to .93 under the base scenario indicating the extent of the adverse impact of a reduction in the support price on the dairies financial performance.

No dairy price support program (Scenario V) reduced the probability of survival from 98 percent under the base scenario to 94 percent. The present value of ending net worth still improved over the ten year period but was 9 percent less compared to the base scenario. The total equity to asset ratio was 0.89 compared to 0.93 under the base scenario after ten years.

Table 16. Comparison of Selected Policy Scenarios on a 550-Cow California Dairy

Criteria	Initial Situation	Base	Alternative Scenario ^{a/}								
			I	II	III	IV	V	VI	VII	VIII	IX
Probability of Survival (Percent)	NA	98	78	78	98	94	94	98	98	98	100
Probability of Positive After tax Net Present Value (Percent)	NA	98	78	76	96	92	94	98	98	98	100
After-tax Net Present Value											
Mean (\$1,000)	NA	1,617	655	505	1,612	1,324	1,288	1,593	2,052	1,773	3,622
Std. dev. (\$1,000)	NA	688	972	947	698	789	840	683	727	706	742
Present Value of Ending Net Worth (\$1,000)	1,261	2,278	1,612	1,501	2,271	2,083	2,072	2,170	2,487	2,414	3,508
Total Long-term Debt											
After 10-years (\$1,000)	156	61	106	111	62	76	70	61	57	57	51
Total Intermediate-Term Debt											
After 10-years (\$1,000)	309	13	157	172	14	40	44	13	12	13	0
Total Equity to Assets											
After 10-years (fraction)	.71	.93	.78	.76	.93	.90	.89	.93	.92	.93	.94
Internal Rate of Return											
After 10-years (fraction)	NA	.115	.007	.000	.115	.091	.056	.118	.133	.118	.186
Average Annual Net Farm Income (\$1,000)	NA	65	-60	-79	64	28	19	64	114	83	276

a/ Scenarios are:

- Base - continuation of present policy through 1985 then milk price equal to 70 percent
- I - a 20% acreage reduction crop program - 9% higher feed costs
- II - an effective 20% acreage reduction crop program - 11% higher feed costs
- III - no crop program
- IV - fifty cent per cent lower milk price
- V - no dairy price support program
- VI - reduce income tax benefit program
- VII - milk supply control program
- VIII - computer feeding technology
- IX - bovine growth hormone technology

NA = not applicable.

Eliminating income tax advantage (Scenario VI) had little impact on the financial performance of the 550-cow California dairy relative to the base scenario. The total debt and total equity to asset ratio was the same as under the base scenario but the present value of ending net worth was about 5 percent less.

A mandatory supply control program (Scenario III) resulting in a milk price \$1.00 per cwt higher than in the base scenario had a favorable impact on the 550-cow California dairy. Compared to the base scenario the present value of ending net worth was \$2,487,000 or 9 percent higher, and the after-tax net present value was \$2,052,000 or 27 percent higher than under the base scenario. The average annual net farm income increased to \$114,000 or 75 percent.

The computer feeding technology (Scenario VIII) increased the present value of ending net worth about 6 percent above the base scenario. Total debt was about 5 percent lower but average annual net farm income was \$18,000 (or 28 percent) higher than with the base scenario.

Given the preliminary assumptions of bovine growth hormone technology (Scenario IX) the financial position of the 550-cow California dairy is greatly improved compared to both the initial position at the beginning of the 10 year period and compared to the base scenario. The present value of ending net worth would be \$3,622,000, almost three times as much as the beginning of the period and twice as what it would be under the base scenario. The probability of survival increases to 100 percent.

1,436-cow California dairy

Given the base policy scenario, the 1,436-cow California dairy had a 98 percent probability of survival and showed good financial progress

from the beginning to the end of the 10 year period (Table 17). The present value of ending net worth was \$6,846,000 compared to \$2,538,000 at the beginning of the ten-year period. The total equity to asset ratio increase from 0.69 at the beginning of the period to 0.93 at the end. Total debt was cut by 85 percent from the beginning to the end of the period.

The acreage reduction scenarios resulting in higher feed prices reduced the probability of survival from 98 percent under the base scenario to 88 percent with 9 percent higher feed costs (Scenario I) and to 82 percent with 11 percent higher feed prices (Scenario II). Total equity to asset ratio was 0.80 under Scenario II compared to 0.93 under the base scenario.

Eliminating the crop program (Scenario III) had little impact on the financial position of the 1,436-cow California dairy compared to the base scenario. Debt, equity to asset ratio and present value of ending net worth are all about the same as under the base scenario.

A milk support price 50 cents lower (Scenario IV) than under the base resulted in a 6 percent lower present value of ending net worth after ten years. Total debt and the total equity to asset ratio were about the same under the two scenarios.

Eliminating the dairy price support program (Scenario V) reduced the probability of survival from 98 percent under the base to 94 percent. The present value of ending net worth was \$6,163,000 or 10 percent lower than under the base scenario.

Eliminating the income tax advantages (Scenario VI) did not impact the probability of survival, total debt or equity to asset ratio compared to the base scenario. However, the present value of ending net worth was decreased 3 percent from the base scenario.

Table 17. Comparison of Selected Policy Scenarios on a 1,436-Cow California Dairy

Criteria	Initial Situation	Base	Alternative Scenario ^{a/}								
			I	II	III	IV	V	VI	VII	VIII	IX
Probability of Survival (Percent)	NA	98	88	98	98	98	94	98	100	100	100
Probability of Positive After Tax Net Present Value (Percent)	NA	98	88	98	98	98	94	98	100	100	100
After-tax Net Present Value											
Mean (\$1,000)	NA	6,000	3,588	2,946	5,983	5,407	5,085	5,931	7,372	8,540	11,534
Std. dev. (\$1,000)	NA	2,007	2,574	2,764	2,044	1,868	2,521	2,000	1,717	1,644	1,999
Present Value of Ending Net Worth (\$1,000)	2,538	6,846	5,024	4,537	6,838	6,429	6,163	6,629	7,786	7,405	10,992
Total Long-term Debts											
After 10-years (\$1,000)	289	105	155	187	105	105	123	105	96	96	96
Total Intermediate-Term Debt											
After 10-years (\$1,000)	842	36	225	325	35	35	118	36	0	0	0
Total Equity to Assets											
After 10-years (fraction)	.69	.93	.85	.80	.93	.94	.89	.93	.95	.95	.95
Internal Rate of Return											
After 10-years (fraction)	NA	.155	.099	.041	.132	.149	.088	.159	.183	.168	.216
Average Annual Net Farm Income (\$1,000)	NA	436	162	68	434	373	313	432	579	463	982

^{a/} Scenarios are:

- Base - continuation of present policy through 1985 then milk price equal to 70 percent
- I - a 20% acreage reduction crop program - 9% higher feed costs
- II - an effective 20% acreage reduction crop program - 11% higher feed costs
- III - no crop program
- IV - fifty cent per cent lower milk price
- V - no dairy price support program
- VI - reduce income tax benefit program
- VII - milk supply control program
- VIII - computer feeding technology
- IX - bovine growth hormone technology

NA = not applicable.

With supply control (Scenario VII), the probability of survival of the 1,436-cow California dairy increased to 100 percent. The present value of ending net worth was \$7,786,000 or about 14 percent higher under the supply control than under the base scenario. All intermediate-term debt was paid off and only \$96,000 of long-term debt remained after ten years under the supply control program. Average annual net farm income increased to \$579,000 or 33 percent higher than under the base scenario.

The computer feeding technology (Scenario VIII) improved the financial position of the 1,436-cow dairy compared to the base scenario. The present value of ending net worth was \$7,405,000 or 8 percent higher and average annual net farm income was 463,000 or 6 percent higher with a computer feeding technology compared to the base scenario.

Given the preliminary data on bovine growth hormone (Scenario IX), the financial position of the 1,436-cow dairy increase substantially compared to the base scenario. Present value of ending net worth was \$10,992,000 or over 60 percent higher than under the base scenario.

Florida dairies

Given the base policy scenario a probability of survival was 100 percent for the 350-cow, 600-cow, and 1,436-cow Florida dairies (Tables 18, 19, and 20). All intermediate-term debt was paid off over the ten year period on all three size dairies. The total equity to asset ratio after ten years was at least 0.92. The present value of ending net worth increased about 80 percent on the 350-cow and 600-cow dairies but over 160 percent on the 1,436-cow dairy.

The acreage reduction policies (Scenario I and II) reduced the probability of the 350-cow dairy surviving the ten year period. The

Table 18. Comparison of Selected Policy Scenarios on a 350-Cow Florida Dairy

Criteria	Initial Situation	Base	Alternative Scenario ^{a/}								
			I	II	III	IV	V	VI	VII	VIII	IX
Probability of Survival (percent)	NA	100	94	90	100	100	98	100	100	NS	100
Probability of Positive After-tax Net Present Value (percent)	NA	100	92	90	100	100	98	100	100	NS	100
After-tax Net Present Value											
Mean (\$1,000)	NA	968	503	390	965	841	947	945	1,143	NS	2,106
Std. dev.	NA	278	348	380	278	290	500	281	280	NS	325
Present Value of Ending Net Worth (\$1,000)	757	1,360	1,036	946	1,357	1,271	1,312	1,250	1,447	NS	1,932
Total long-term debts											
After 10-years (\$1,000)	144	83	98	109	83	87	89	84	83	NS	83
Total Intermediate-term Debt											
After 10-years (\$1,000)	160	0	29	49	0	0	10	0	0	NS	0
Total Equity to Assets											
After 10-years (fraction)	.71	.92	.88	.85	.92	.92	.91	.92	.92	NS	.90
Internal Rate of Return											
After 10-years (fraction)	NA	.125	.083	.064	.125	.117	.120	.126	.137	NS	.185
Average Annual Net Farm Income (\$1,000)	NA	52	1	-14	52	38	48	59	71	NS	173

^{a/} Scenarios are:

- Base - continuation of present policy through 1985 then milk price equal to 70 percent
- I - a 20% acreage reduction crop program - 9% higher feed costs
- II - an effective 20% acreage reduction crop program - 11% higher feed costs
- III - no crop program
- IV - fifty cent per cent lower milk price
- V - no dairy price support program
- VI - reduce income tax benefit program
- VII - milk supply control program
- VIII - computer feeding technology
- IX - bovine growth hormone technology

NA = not applicable.

NS = not simulated.

Table 19. Comparison of Selected Policy Seminars on a 600-Cow Florida Dairy

Criteria	Initial Situation	Base	Alternative Scenario ^{a/}									
			I	II	III	IV	V	VI	VII	VIII	IX	
Probability of Survival (Percent)	NA											
Probability of Positive After tax Net Present Value (Percent)	NA	100	100	98	100	100	100	100	100	100	100	100
After-tax Net Present Value												
Mean (\$1,000)	NA	1,965	1,240	1,077	1,959	1,754	1,981	1,918	2,262	2,137	3,946	
Std. dev. (\$1,000)	NA	458	470	478	460	480	784	456	472	471	583	
Present Value of Ending Net Worth (\$1,000)	1,465	2,606	2,221	2,120	2,603	2,506	2,624	2,410	2,708	2,746	3,771	
Total Long-term debts												
After 10-years (\$1,000)	218	116	116	124	116	116	116	116	116	116	116	
Total Intermediate-Term Debt												
After 10-years (\$1,000)	244	0	0	2	0	0	0	0	0	0	0	
Total Equity to Assets												
After 10-years (fraction)	.76	.92	.93	.	.92	.92	.93	.92	.92	.92	.92	
Internal Rate of Return												
After 10-years (fraction)	NA	.120	.093	.087	.120	.113	.122	.122	.131	.123	.179	
Average Annual Net Farm Income (\$1,000)	NA	126	49	32	125	104	123	126	156	146	329	

^{a/} Scenarios are:

- Base - continuation of present policy through 1985 then milk price equal to 70 percent
- I - a 20% acreage reduction crop program - 9% higher feed costs
- II - an effective 20% acreage reduction crop program - 11% higher feed costs
- III - no crop program
- IV - fifty cent per cent lower milk price
- V - no dairy price support program
- VI - reduce income tax benefit program
- VII - milk supply control program
- VIII - computer feeding technology
- IX - bovine growth hormone technology

NA = not applicable.

Table 20. Comparison of Selected Policy Scenarios on a 1,436-Cow Florida Dairy

Criteria	Initial Situation	Base	Alternative Scenario ^{a/}									
			I	II	III	IV	V	VI	VII	VIII	IX	
Probability of Survival (Percent)	NA	100	100	100	100	100	100	100	100	100	100	100
Probability of Positive After tax Net Present Value (Percent)	NA	100	100	100	100	100	100	100	100	100	100	100
After-tax Net Present Value												
Mean (\$1,000)	NA	7,749	5,931	5,530	7,733	7,230	7,772	7,505	8,474	8,214	12,720	
Std. dev. (\$1,000)	NA	1,169	1,171	1,168	1,171	1,202	1,957	1,172	1,201	1,189	1,466	
Present Value of Ending Net Worth (\$1,000)	3,343	8,697	7,385	7,087	8,687	8,324	8,753	8,313	9,150	9,150	12,366	
Total Long-term debts												
After 10-years (\$1,000)	476	195	195	195	195	195	195	195	195	195	195	
Total Intermediate-Term Debt												
After 10-years (\$1,000)	469	0	0	0	0	0	0	0	0	0	0	
Total Equity to Assets												
After 10-years (fraction)	.76	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	
Internal Rate of Return												
After 10-years (fraction)	NA	.158	.137	.132	.113	.152	.158	.163	.167	.161	.201	
Average Annual Net Farm Income (\$1,000)	NA	591	418	380	590	540	588	588	662	617	1,072	

^{a/} Scenarios are:

- Base - continuation of present policy through 1985 then milk price equal to 70 percent
- I - a 20% acreage reduction crop program - 9% higher feed costs
- II - an effective 20% acreage reduction crop program - 11% higher feed costs
- III - no crop program
- IV - fifty cent per cent lower milk price
- V - no dairy price support program
- VI - reduce income tax benefit program
- VII - milk supply control program
- VIII - computer feeding technology
- IX - bovine growth hormone technology

NA = not applicable.

probability of survival remained at 100 percent on the large 600-cow and 1,436-cow Florida dairies.

Eliminating the crop program (Scenario III) had relatively little impact on all three size Florida dairies as the probability of survival remained unchanged at 100 percent.

A milk support price 50 cents below the base (Scenario IV) did not affect the probability of survival that remained at 100 percent for all three size Florida dairies. The present value of ending net worth was about 6 percent lower for the 350-cow dairy and 4 percent lower for the 600- and 1,436-cow dairies with the 50 cent lower support price compared to the base scenario.

No dairy program (Scenario V) reduced the probability of survival for the 350-cow dairy from 100 to 98 percent but the probability of survival remained at 100 percent for the larger 600- and 1,436-cow dairies. The present value of ending net worth and total equity to asset ratio were both slightly less under the no dairy program scenario than under the base scenario.

Eliminating income tax advantages (Scenario VI) would have relatively little impact on all three size dairies in Florida. The present value of ending net worth was about 5 percent less than under the base scenario. Total debt and total equity to asset ratios would remain about the same as under the base scenario.

A supply control policy (Scenario VII) would improve the financial position of each of the three Florida dairies. The present value of ending net worth would increase about 6 percent for the 350-cow dairy, 4 percent for the 600-cow dairy, and 5 percent for the 1,436-cow dairy.

Like dairies in other regions, both computer feeding (Scenario VIII) and especially bovine growth hormone (Scenario IX) improved the financial position of the three Florida dairies after 10 years compared to the base scenario.

Results for Financial Stress Scenarios

Minnesota dairies

Given the High Debt Base Scenario, the 52-cow Minnesota dairy had only a 4 percent probability of survival over the 10 year period (Table 21). The financial position of the dairies deteriorated from the beginning to the end of the 10 year period. The present value of ending net worth declined from \$245,000 to \$220,000, long-term debt increased from \$231,000 to \$599,000, and intermediate-term debt increased from \$109,000 to \$280,000 after 10 years. The equity to asset ratio declined from .42 to .23.

An interest subsidy (Scenario XI) would increase the probability of survival to 20 percent, slightly reduce total debt, increase the present value of ending net worth from \$220,000 to \$273,000 compared to the high debt base scenario (X).

Restructuring debt would not improve the probability of survival (actually reduced it from 4 to 2 percent). The present value of ending net worth would be \$248,000 by restructuring debt compared to \$220,000 under the high debt base scenario.

The high debt new entrant (Scenario XIII) had a zero probability of survival which of course was not changed under higher feed prices (Scenarios XIV and XV).

The 125-cow Minnesota dairy in an initial high debt position had zero probability of survival (Scenario X) which did not change under either the

Table 21. Comparison of selected policy scenarios on 52-cow Minnesota assuming high debt and new entrant with high debt.^{a/}

Criteria	High Debt				New Entrants			
	Initial	Scenarios			Initial	Scenarios		
	Situation	X	XI	XII	Situation	XIII	XIV	XV
Probability of Survival (percent)	NA	4	20	2	NA	0	0	0
Probability of positive after-tax net present value (percent)	NA	4	16	2	NA	0	0	0
After-tax net present value								
mean (\$1,000)	NA	-227	-132	-199	NA	-231	-232	-246
std. dev. (\$1,000)	NA	784	186	65	NA	99	989	107
Present value of ending net worth (\$1,000)	245	220	273	248	264	297	296	281
Total long-term debts after 10-years (\$1,000)	232	599	608	604	270	599	599	599
Total intermediate-term debt after 10-years (\$1,000)	109	280	239	239	195	450	451	455
Total equity to assets after 10-years (fraction)	.42	.23	.27	.25	.36	.23	.23	.22
Internal rate of return after 10-years (fraction)	NA	-.145	-.078	-.141	NA	-.165	-.165	-.151
Average annual net farm income (\$1,000)	NA	-77	-56	-27	NA	-146	-146	-151

^{a/} Scenarios are:

- X Base - continuation of present dairy policy through 1985 then milk price equal to 70 percent of parity from 1986-1992 and assuming high debt.
- XI Subsidize interest rate so effective rate on all loans is 8 percent.
- XII Restructure debt.
- XIII Base - continuation of present dairy policy through 1985 then milk price equal to 70 percent of parity from 1986-1992 and assuming a new entrant with high debt.
- XIV A 20 percent acreage reduction crop program - 9 percent higher feed price.
- XV An effective 20 percent acreage reduction in crop program - 11 percent higher feed price.

NA = not applicable.

interest subsidy scenario (XI) or the debt restructure scenario (XII) (Table 22). A new entrant with high debt also had a zero probability of survival (Scenario XIII). Therefore, there was a zero probability of survival under both higher feed cost scenarios (XIV and XV).

359-cow Arizona dairy

Given the high debt base scenario (X), the 359-cow Arizona dairy had a 70 percent probability of survival and improved its financial position from the beginning to the end of the 10 year period. The present value of ending net worth was \$966,000 or about double the beginning net worth. Long-term debt remained about the same over the 10-year period but more than half the intermediate-term debt was paid off. The total equity to asset ratio increased from 0.45 at the beginning of the period to 0.65 at the end.

Restructuring debt (Scenario XII) did not increase the probability and only slightly improved the present value of ending net worth and equity to asset ratio compared to the high debt base scenario (X).

A new entrant with high debt had a 64 percent probability to survive over the 10 year period (Scenario XIII).

350-cow Florida dairy

Given the high debt base scenario (X), the 350-cow Florida dairy had a 62 percent probability of survival but, like the 359-cow Arizona dairy, was able to improve its financial position over the 10-year period (Table 24). Present value of ending net worth was \$678,000 compared to a beginning net worth of \$466,000. The total equity to asset ratio increased from 0.45 at the beginning to 0.62 at the end of the 10-year period.

Criteria	High Debt				New Entrants			
	Initial	Scenarios			Initial	Scenarios		
	Situation	X	XI	XII	Situation	XIII	XIV	XV
Probability of Survival (percent)	NA	0	0	0	NA	0	0	0
Probability of positive after-tax net present value (percent)	NA	0	0	0	NA	0	0	0
After-tax net present value mean (\$1,000)	NA	-108	-99	-103	NA	-103	-104	-109
After-tax net present value std. dev. (\$1,000)	NA	314	30	31	NA	425	425	46
Present value of ending net worth (\$1,000)	5549	99	1	144	575	151	151	135
Total long-term debts after 10-years (\$1,000)	532	265	269	271	599	269	269	269
Total intermediate-term debt after 10-years (\$1,000)	204	146	134	138	364	241	241	244
Total equity to assets after 10-years (fraction)	.44	.20	.21	.22	.37	.22	.22	.21
Internal rate of return after 10-years (fraction)	NA	-.190	-.176	-.182	NA	-.069	-.069	-.074
Average annual net farm income (\$1,000)	NA	-47	-37	-46	NA	-97	-97	-99

a/ Scenarios are:

- X Base - continuation of present dairy policy through 1985 then milk price equal to 70 percent of parity from 1986-1992 and assuming high debt.
- XI Subsidize interest rate so effective rate on all loans is 8 percent.
- XII Restructure debt.
- XIII Base - continuation of present dairy policy through 1985 then milk price equal to 70 percent of parity from 1986-1992 and assuming a new entrant with high debt.
- XIV A 20 percent acreage reduction crop program - 9 percent higher feed price.
- XV An effective 20 percent acreage reduction in crop program - 11 percent higher feed price.

NA = not applicable.

Table 23. Comparison of selected policy scenarios on a 359-cow Arizona dairy assuming high debt and new entrant with high debt.^{a/}

Criteria	High Debt				New Entrants			
	Initial	Scenarios			Initial	Scenarios		
	Situation	X	XI	XII	Situation	XIII	XIV	XV
Probability of Survival (percent)	NA	70	NS	70	NA	64	44	62
Probability of positive after-tax net present value (percent)	NA	70	NS	70	NA	64	44	62
After-tax net present value mean (\$1,000)	NA	828	NS	832	NA	696	184	484
std. dev. (\$1,000)	NA	816	NS	811	NA	784	646	775
Present value of ending net worth (\$1,000)	471	966	NS	970	528	946	547	797
Total long-term debts after 10-years (\$1,000)	139	132	NS	153	163	164	156	154
Total intermediate-term debt after 10-years (\$1,000)	432	146	NS	142	553	212	349	227
Total equity to assets after 10-years (fraction)	.45	.65	NS	.66	.42	.64	.47	.61
Internal rate of return after 10-years (fraction)	NA	.059	NS	.040	NA	.087	-.024	.068
Average annual net farm income (\$1,000)	NA	-13	NS	-14	NA	-66	-147	-95

^{a/} Scenarios are:

- X Base - continuation of present dairy policy through 1985 then milk price equal to 70 percent of parity from 1986-1992 and assuming high debt.
- XI Subsidize interest rate so effective rate on all loans is 8 percent.
- XII Restructure debt.
- XIII Base - continuation of present dairy policy through 1985 then milk price equal to 70 percent of parity from 1986-1992 and assuming a new entrant with high debt.
- XIV A 20 percent acreage reduction crop program - 9 percent higher feed price.
- XV An effective 20 percent acreage reduction in crop program - 11 percent higher feed price.

NA = not applicable.

NS = not simulated.

Table 24. Comparison of selected policy scenarios on a 350-cow Florida dairy assuming high debt and new entrant with high debt.^{a/}

Criteria	High Debt				New Entrants			
	Initial Situation	Scenarios			Initial Situation	Scenarios		
		X	XI	XII		XIII	XIV	XV
Probability of Survival (percent)	NA	62	82	64	NA	32	10	28
Probability of positive after-tax net present value (percent)	NA	62	82	64	NA	32	10	28
After-tax net present value mean (\$1,000)	NA	410	843	431	NA	53	-204	310
std. dev. (\$1,000)	NA	525	477	516	NA	450	195	617
Prevent value of ending net worth	466	678	852	697	527	848	279	435
Total long-term debts after 10-years (\$1,000)	210	200	189	232	245	238	243	239
Total intermediate-term debt after 10-years (\$1,000)	384	166	83	149	528	401	568	447
Total equity to assets after 10-years (fraction)	.44	.62	.74	.63	.41	.43	.26	.34
Internal rate of return after 10-years (fraction)	NA	.055	.089	.063	NA	-.019	-.053	-.073
Average annual net farm income (\$1,000)	NA	-30	15	-29	NA	-132	-191	-160

^{a/} Scenarios are:

- X Base - continuation of present dairy policy through 1985 then milk price equal to 70 percent of parity from 1986-1992 and assuming high debt.
- XI Subsidize interest rate so effective rate on all loans is 8 percent.
- XII Restructure debt.
- XIII Base - continuation of present dairy policy through 1985 then milk price equal to 70 percent of parity from 1986-1992 and assuming a new entrant with high debt.
- XIV A 20 percent acreage reduction crop program - 9 percent higher feed price.
- XV An effective 20 percent acreage reduction in crop program - 11 percent higher feed price.

NA = not applicable.

The interest subsidy (Scenario XI) increased the probability of survival from 62 percent to 82 percent and increased the present value of ending net worth from \$678,000 to \$852,000 compared to the high debt base scenario (X). The debt restructuring policy (scenario XII) improved the financial position of the 350-cow Florida dairy compared to the high debt base (Scenario X). However, the improvement was considerably less than under the interest subsidy.

A new entrant with high debt had only a 32 percent probability of survival (Scenario XII). The probability of survival declined to 28 percent with 9 percent higher feed costs (Scenario XIV) and 11 percent higher feed costs (Scenario XV).

Summary-of ten-year simulations

Financial data were combined with the whole farm budgets to provide a beginning 1983 financial situation for eight of the twenty-two dairies analyzed in this report. The ten-year economic viability and performance of each dairy was then simulated under selected policy and technology scenarios. The major findings of this analysis include the following:

1. All dairies except the 52-cow Minnesota operation were able to increase the present value of ending net worth after ten years, assuming a continuation of present price support policy through 1985 followed by a support price equal to 70 percent of parity.
2. The larger the dairy the greater its financial success over the ten-year simulation period.
3. Under the base scenario, dairies in Florida showed greater financial success than their counter parts in Arizona, California and Minnesota.

This reflects low investment requirements, and high milk prices relative to other states.

4. Acreage reduction policies for crops and the associated higher feed prices had greatest financial impact on dairies that purchase most of the feed from off the farm. These policies had relatively little impact on Minnesota dairies where most feed is raised on the dairies.

5. Eliminating all crop programs, thereby, increasing the variability of feed prices, had little financial impact on all dairies compared to the base scenario. Most dairies did well enough under the base scenario to absorb the added shocks of more variable feed prices.

6. Lowering the milk price support 50 cents per hundredweight had the greatest adverse impact on smaller dairies whose financial situation was tighter than on larger dairies. However, the financial condition of all dairies was adversely affected compared to the base scenario.

7. The increased variability of milk prices that would be expected to occur with no dairy price support program did not greatly affect the financial performance of any of the eight dairy operations.

8. Eliminating selected advantages in calculating income tax liabilities had relatively little impact on the probability of survival for any dairy and the present value of ending net worth and the average net farm income were only slightly impacted.

9. A mandatory quota program to control milk supply and provide a milk price \$1.00 per cwt above the basic scenario prices, enabled most dairies to significantly increase net worth over the ten-year simulation period. The greatest advantage went to larger rather than smaller dairies.

10. Computerized feeding technology can potentially improve the financial situation for all dairies based on initial research on this technology.

11. Preliminary research results for the bovine growth hormone indicates that this technology can greatly increase the financial viability of all dairies that adopt it. However, major questions regarding this technology still remain before the long-term impact can be reliably evaluated.

12. The probability of survival over ten years for any dairy depends greatly on the initial financial position. Dairies with high debt and new entrants with high debt had significantly lower probabilities of surviving for ten years than dairies with initial financial situations assumed in the base. Neither interest subsidies nor opportunities for debt restructuring greatly improved the chances of high debt farms remaining solvent.

13. Alternative policies and technologies that are favorable for dairy provide greater financial opportunities for large than for small dairies. The reverse is true for policies that adversely affect dairy such as higher feed costs, fewer tax benefits and no dairy price support program.

14. The major advantage enjoyed by larger rather than small dairies is more related to size of operation than to specific dairy policies. This suggests a continued trend to fewer and larger dairies in all regions and especially regions where climate is more favorable to large scale dairy farming.

Appendix A

Investment and ownership cost assumptions for twenty-two dairy operations.

TABLE A1--INVESTMENT AND OWNERSHIP COST ASSUMPTIONS FOR MINNESOTA 52 COW DAIRY, 1982

ITEM	: USEFUL: SALVAGE: PROPERTY: INSUR-:		: COST : LIFE : VALUE : TAX2/ : ANCE2/: REPAIRS1/			
	DOLLARS	YEARS	PERCENT	---DOLLARS---	PERCENT	
BARN - MILK COWS	: 100,097	20	.00	1.50	.60	.010
CALF HUTCHES	: 1,250	15	.00	1.50	.60	.020
EXCAVATION - BARN AREA	: 1,000	20	.00	1.50	.00	.000
MILKING UNITS	: 1,474	8	.00	.00	.60	.060
VACUUM PACKAGE	: 2,898	8	.00	.00	.60	.048
RECEIVER PACKAGE	: 2,553	8	.00	.00	.60	.048
PIPELINE WASHER	: 763	8	.00	.00	.60	.048
MILK LINE	: 2,200	15	.10	.00	.60	.020
INSTALLATION-MILKING SYSTE	: 1,575	15	.00	.00	.60	.000
BULK TANK	: 7,500	15	.10	.00	.60	.048
CONDENSING UNITS	: 2,045	7	.00	.00	.60	.048
STAINLESS WASH TANK	: 300	20	.10	.00	.60	.000
HOT WATER HEATER	: 550	10	.10	.00	.01	.048
CORRALS & GATES	: 1,530	20	.00	1.50	.05	.010
LOADING CHUTE	: 2,000	20	.00	1.50	.60	.010
WELL AND WATER SYSTEM	: 6,150	20	.00	1.50	.60	.042
WASTE HANDLING SYSTEM	: 16,703	20	.00	.00	.60	.048
EXCAVATION - WASTE SYSTEM	: 200	20	.00	.00	.60	.000
DIESEL FUEL TANK	: 550	20	.20	.00	.60	.000
GAS FUEL TANK	: 550	20	.20	.00	.60	.000
BACK-UP GENERATOR	: 6,500	15	.20	.00	.60	.048
FEED BUNKS	: 12,825	15	.00	1.50	.60	.030
UPRIGHT SILO(S)	: 39,692	20	.00	1.50	.60	.010
SHOP AND TOOLS	: 8,000	20	.10	1.50	.60	.020
ELEVATOR (POWER TAKE OFF)	: 2,000	15	.10	.00	.60	.013
SILAGE WAGON(S)	: 12,056	10	.10	.00	.60	.050
HAY WAGON(S)	: 3,420	20	.10	.00	.60	.010
SOLID MANURE SPREADER	: 4,216	12	.10	.00	.60	.030
FRONT END LOADER	: 3,500	15	.10	.00	.60	.048
SCRAPER BLADE	: 1,200	15	.10	.00	.60	.048
SKID STEER LOADER	: 8,000	8	.10	.00	.60	.048
TRACTOR-125 HORSEPOWER	: 42,000	10	.10	.00	.60	.048
TRACTOR-60 HORSEPOWER	: 20,022	12	.10	.00	.60	.048
TRACTOR-40 HORSEPOWER	: 15,117	10	.10	.00	.60	.048
PICK-UP(S) 3/4 TON	: 10,786	5	.20	.00	5.20	.048
GOOSENECK TRAILER	: 3,800	15	.10	.00	.60	.020
ONEWAY PLOW (4-BOTTOM)	: 1,425	12	.10	.00	.60	.040
DISK (12 FOOT)	: 5,080	15	.10	.00	.60	.038
HARROW	: 4,665	15	.10	.00	.60	.030
CORN PLANTER (4-ROW)	: 8,657	10	.10	.00	.60	.048
CULTIVATOR (4-ROW)	: 2,824	12	.10	.00	.60	.050
CHOPPER	: 12,615	9	.10	.00	.60	.050
BLOWER	: 2,882	9	.10	.00	.60	.050
SWATHER (SELF PROP)	: 18,136	10	.10	.00	.60	.048
RAKE	: 2,593	10	.10	.00	.60	.048
BALER	: 8,658	6	.10	.00	.60	.050
GRAIN DRILL (10 FOOT)	: 6,238	12	.10	.00	.60	.048
SPRAYER	: 4,375	12	.10	.00	.60	.048

1/ PERCENT OF ORIGINAL COST

2/ PROPERTY TAX AND INSURANCE VALUED PER \$100

TABLE A2--INVESTMENT AND OWNERSHIP COST ASSUMPTIONS FOR MINNESOTA 125 COW DAIRY, 1982

ITEM	: USEFUL: SALVAGE: PROPERTY: INSUR-:		: COST : LIFE : VALUE : TAX2/ :		: ANCE2/: REPAIRS1/	
	DOLLARS	YEARS	PERCENT	---	DOLLARS---	PERCENT
BARN - MILK COWS	: 135,625	20	.00	1.50	.60	.010
CALF HUTCHES	: 2,750	15	.00	1.50	.60	.020
PARLOR AND HOLDING AREA	: 65,900	20	.00	1.50	.60	.020
EXCAVATION - BARN AREA	: 1,500	20	.00	1.50	.00	.000
MILKING STALLS-GRATES	: 13,888	14	.00	.00	.60	.048
MILKING UNITS	: 5,166	10	.00	.00	.60	.060
VACUUM PACKAGE	: 4,727	10	.00	.00	.60	.048
RECEIVER PACKAGE	: 2,983	10	.00	.00	.60	.048
PIPELINE WASHER	: 1,122	10	.00	.00	.60	.048
MILK LINE	: 4,800	15	.10	.00	.60	.020
AUTO DETACH/BACKFLUSH	: 33,352	8	.00	.00	.30	.080
CROWD GATE (ELE)	: 2,091	14	.00	.00	.60	.048
AUTO PARLOR FEEDERS	: 4,669	15	2.00	.00	.60	.048
INSTALLATION-MILKING SYSTE	: 4,690	10	.00	.00	.60	.000
PLATE COOLERS	: 1,968	15	.00	.00	.60	.060
BULK TANK	: 14,045	15	.10	.00	.60	.048
CONDENSING UNITS	: 5,426	7	.00	.00	.60	.048
STAINLESS WASH TANK	: 300	20	.10	.00	.60	.000
HOT WATER HEATER	: 550	7	.10	.00	.01	.048
CORRALS & GATES	: 1,226	20	.00	1.50	.05	.010
LOADING CHUTE	: 2,000	20	.00	1.50	.60	.010
WELL AND WATER SYSTEM	: 6,150	20	.00	1.50	.60	.042
WASTE HANDLING SYSTEM	: 23,946	20	.00	.00	.60	.048
EXCAVATION - WASTE SYSTEM	: 250	20	.00	.00	.60	.000
DIESEL FUEL TANK	: 1,100	20	.20	.00	.60	.000
GAS FUEL TANK	: 1,100	20	.20	.00	.60	.000
BACK-UP GENERATOR	: 6,500	15	.20	.00	.60	.048
FEED BUNKS	: 22,280	15	.00	1.50	.60	.030
UPRIGHT SILO(S)	: 69,922	20	.00	1.50	.60	.010
HAY BARN	: 12,000	20	.10	1.50	.60	.020
SHOP AND TOOLS	: 10,079	20	.00	1.50	.60	.020
FEED MIXER WAGON	: 12,000	8	.10	.00	.60	.050
SILAGE WAGON(S)	: 24,112	8	.10	.00	.60	.050
HAY WAGON(S)	: 3,420	20	.10	.00	.60	.010
SOLID MANURE SPREADER	: 7,183	10	.10	.00	.60	.030
FRONT END LOADER	: 3,500	15	.10	.00	.60	.048
SCRAPER BLADE	: 1,200	15	.10	.00	.60	.048
SKID STEER LOADER	: 8,000	8	.10	.00	.60	.048
TRACTOR-125 HORSEPOWER	: 42,000	8	.10	.00	.60	.048
TRACTOR-60 HORSEPOWER	: 40,044	8	.10	.00	.60	.048
TRACTOR-40 HORSEPOWER	: 30,234	10	.10	.00	.60	.048
PICK-UP(S) 3/4 TON	: 10,786	5	.20	.00	5.20	.048
GOOSENECK TRAILER	: 3,800	15	.10	.00	.60	.020
ONEWAY PLOW (4-BOTTOM)	: 2,756	10	.10	.00	.60	.040
DISK (12 FOOT)	: 5,080	12	.10	.00	.60	.038
HARROW	: 4,665	14	.10	.00	.60	.030
CORN PLANTER (4-ROW)	: 8,657	8	.10	.00	.60	.048
CULTIVATOR (4-ROW)	: 2,823	11	.10	.00	.60	.050
CHOPPER	: 1,215	6	.10	.00	.60	.050
BLOWER	: 2,882	6	.10	.00	.60	.050
SWATHER (SELF PROP)	: 21,872	8	.10	.00	.60	.048
RAKE	: 2,593	8	.10	.00	.60	.048
BALER	: 8,658	7	.10	.00	.60	.050
GRAIN DRILL (10 FOOT)	: 6,238	10	.10	.00	.60	.048
SPRAYER	: 4,375	10	.10	.00	.60	.048

1/ PERCENT OF ORIGINAL COST

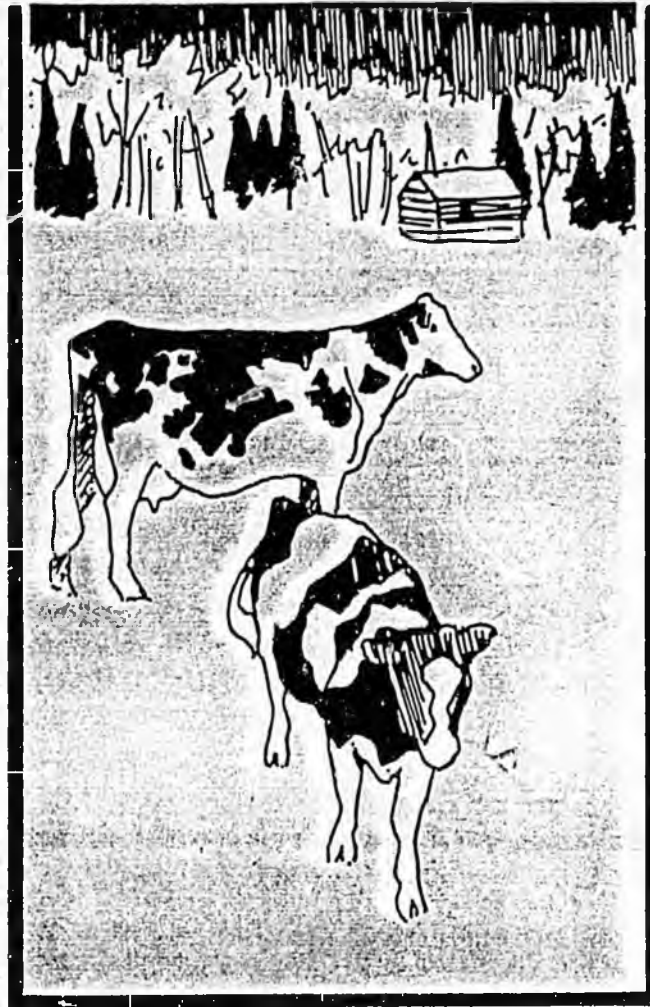
2/ PROPERTY TAX AND INSURANCE VALUED PER \$100

EXHIBIT D

Point MacKenzie

Agricultural Project

SALE BROCHURE



LAST COPY

Department of Natural Resources
Alaska Agricultural Action Council
September 11, 1982



STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF LAND AND WATER MANAGEMENT
323 East Fourth Avenue
Anchorage, Alaska

POINT MACKENZIE AGRICULTURAL INTEREST SALE

Lottery #10

Lottery Filing Period: 8:00 a.m., Wednesday, July 7, 1982 through
4:30 p.m., Friday, August 20, 1982.

Place of Lottery: Palmer High School
Little Theater
West Arctic Avenue
Palmer, Alaska

Date of Lottery: September 11, 1982

Time of Lottery: 10:00 a.m. (local time). Information Briefing and
Lottery Drawing.

INTRODUCTION

In an effort to develop agricultural land as a renewable resource of the State, the Alaska Department of Natural Resources in cooperation with the Alaska Agricultural Action Council is disposing of approximately 13,940 acres of agricultural land in the vicinity of Pt. MacKenzie, Alaska. The major objectives are to stimulate in-state milk production, to provide milk to Alaska consumers at a competitive market price, and to assist in gaining agricultural self-sufficiency for the State of Alaska. Therefore, subject to the provisions of AS 38.04 and AS 38.05 and pursuant to the regulations promulgated thereunder, the Director of the Division of Land and Water Management, or his authorized representative, will sell (the agricultural interest) by lottery in the following described real property located within the Palmer Recording District.

PARCELS FOR SALE

The agricultural interest in twenty-nine (29) parcels ranging in size from 301.75 acres to 632.24 acres and totaling 13,940 acres will be offered for sale. The sale of all parcels will be under the terms and conditions set forth in this brochure and in the sale contract. Sample sales contracts are available for inspection through the Southcentral District Office. Land discounts pursuant to AS 38.05.058 and 11 AAC 67.900-915 are available to eligible Alaskans.

EXHIBIT E

JOSEPH PATRICK CANGE
CERTIFIED PUBLIC ACCOUNTANT
BOX 4-647
ANCHORAGE, ALASKA 99509
TELEPHONE (907) 344-8887

January 1, 1984

Mr. Jalmar M. Kerttula
President, Alaska State Senate
Pouch V
Juneau, Alaska 99811

Subject: Point MacKenzie Agricultural Project

Dear Jalmar,

Let me first express my sincere thanks and appreciation for taking the time to hear my thoughts and concerns regarding the Point MacKenzie dairy project.

I would like to restate my primary viewpoint: if this project is to be successful, then everything has to be done to create the best economic units possible, not just on one parcel, but on all parcels.

The milk provided at Point MacKenzie is going to compete in the market place with Outside milk. If we create units that are not the most economically efficient possible, then the project cannot compete, and Point MacKenzie will be a failure.

The "Point MacKenzie Agricultural Project Sale Brochure" (which is probably your own words) states: "The major objectives are to stimulate in-state milk production, to provide milk to Alaska consumers at a competitive market price...". This, I believe, should be everyone's goal -- to guarantee a successful project.

There should be no question in anyone's mind that if the project fails, then everyone loses: YOU as its creator, the STATE as its financial backer, the ALASKAN CITIZEN through loss of potential jobs, and the POINT MACKENZIE FARMER in lost investment. In addition, a failure here will also create a negative impact on other potential agricultural projects.

I feel that the project can be economically viable. However, only through your assistance and guidance will it become a successful project.

Mr. Jalmar M. Kerttula
January 1, 1984
Page 2

I believe that the following items, if done, will further our common goals related to Point MacKenzie.

I. ELECTRICITY TO EACH PARCEL

Initial cost of electrical generation facilities per farm is approximately \$50,000. KWH costs are nearly five times higher than MEA power. In short, to be competitive, power must be accessible to each parcel.

"Dairy farmers who generate their own electricity at present do so at a cost of up to \$100 a day for each farm".
(Anchorage Daily News, December 18, 1983).

Governor Sheffield stated at the 6th Annual University of Alaska Symposium on Agriculture that he would "support an appropriation of \$3,000,000 to extend electricity to Point MacKenzie." We should make sure that this is included in the budget.

II. NATURAL GAS TO EACH PARCEL

Natural gas, as with electricity, provides an economic benefit to the dairies. Natural gas is the cheapest form of energy that we have in Alaska. This advantage should be utilized.

III. RELAXATION OF DEVELOPMENT SCHEDULE

The farm development schedule, as it now exists, provides for a two-part stocking rate of approximately 1/2 by November 1, 1985, and the other 1/2 by November 1, 1988. This provision should be relaxed to permit the entire stocking rate by November 1, 1988. There are a number of reasons for this.

First, more time is needed to get the infrastructure established -- such as electric, gas, telephone and processing plant.

Second, there are not enough qualified people available to complete all the things necessary to get all 17 dairies on line by November 1, 1985.

Third, if the dairies come on line over a longer period of time, the first dairies can provide cows to the later dairies. This would provide additional income for the early dairies and reduced cow costs for later dairies.

Fourth, there are going to be mistakes made by the early dairies. The later dairies can learn from their predecessors, and this should result in better units.

Fifth, because the operation of a dairy requires such substantial capital and labor costs initially, it is not feasible to have a dairy come on line in two phases.

To be economically viable it has to come on line with nearly 200 cows -- not with 37 cows in 1985 and 65 cows in 1988 as it is now proposed, for example, on Dairy 101. The high front-in cost of the milking parlor, waste facility, and other fixed costs, do not permit this phasing concept.

Sixth, it will require more time to get the field in condition to provide necessary forage crops and grain for food base. It will take two or three more years to burn berm piles and condition soil for effective planting and harvest of crops. Nothing could be worse than having the cows on line prior to having food base on line. The food base should come first.

IV. COMBINING TWO PARCELS INTO ONE FARM

The current interpretation of the regulations requires that two parcels cannot be combined into one farm. This should be changed to permit the combining of two parcels into one farm with the following limitations:

- (a) The parcels must be contiguous (separation by streets and easements permitted).
- (b) The minimum number of cows on combined farms must be 1 1/2 times the total required on the two separate farms. The added total milk production should help justify this change.
- (c) The lending regulations must be changed to increase loan limits to \$1,500,000 per farm. The existing limit is not high enough and is making it hard on current operators.

Mr. Jalmar M. Kerttula
January 1, 1984
Page 4

Combining of farms will encourage more economical units. At the same time it will guarantee a minimum of 10 separate dairies so that no one large dairy is formed. I believe it is better to make this change NOW, not after inefficient dairies have gone broke.

A 200-cow dairy is going to require 750-800 acres of land for food base. The combining of dairies will permit this. Dairy 116, for example, has only about 270 acres of usable Class II/III soils. This would only permit a dairy based upon food base requirements of 68 cows. This size farm is not economically feasible. A combining of 116 with 117, for example, will permit a 200-cow facility on 117, which makes 116 and 117 a good economic unit.

I think that capital invested should be invested to maximize the efficiency of the industry. It would be far better to have a 150-200 cow facility rather than two 75-100 cow facilities.

The savings created by a consolidation of dairies could go to developing an efficient processing plant. This modern plant should be at Point MacKenzie, and be owned by all Point MacKenzie dairy farmers. If dairying is to be viable in the marketplace, we cannot depend upon Matanuska Maid to process and market milk. Matanuska Maid loses money on every gallon it sells. It is becoming more and more uneconomical. It cannot compete with Outside milk because its costs of operation are too high..

The worst thing that could happen is to have the 17 Point MacKenzie farms, plus the existing eight farms, ready to sell milk to Matanuska Maid -- only to discover that they could not sell it in the marketplace because of Matanuska Maid's inefficiency. Unfortunately I fear this is the direction in which we are now headed.

The data that I have indicates that the processing plant is the most profitable part of the whole industry. If the farmers owned their own processing plant, profits from the plant could be returned to them.

My calculations show that Point MacKenzie, plus existing dairies, could produce 50% of 1987 projected Railbelt milk consumption. The industry could not, with Matanuska Maid processing the milk, market the projected milk production because Matanuska Maid would not be competitive with Outside milk. The producing industry would probably have to lower its price to make the end product competitive. Therefore, a processing plant is a necessary investment if Alaskan milk is to be competitive with Outside milk.

Mr. Jalmar M. Kerttula
January 1, 1984
Page 5

V. SUMMARY

I am asking that you assist us to:

- (a) provide the basic infrastructure;
- (b) allow more time for orderly development;
- (c) allow for more efficient dairy units, and
- (d) help insure that we invest capital in those things that bring the greatest return to make Alaska milk competitive.

The changes that I am requesting are necessary because the State did not follow your initial idea of pre-qualification conditions. If that would have been done, then you would have probably had existing dairy farmers expanding into Point MacKenzie who would have had experience, herds, and food base. As it is now, only the Lees have this sort of qualifications.

I hope we can all work cooperatively and in unison on this project. I know that the program was not intended to be a corporate operation as I envision on our parcels, but I think there is room for both. I believe that the paramount concern should be to make the project successful, and our suggested changes will help accomplish this.

Sincerely yours,

Joseph Patrick Cange

J:p

EXHIBIT R

JOSEPH PATRICK CANGE
CERTIFIED PUBLIC ACCOUNTANT
BOX 4-647
ANCHORAGE, ALASKA 99509
TELEPHONE (907) 344-8887

June 22, 1984

Mr. Bob Heath
6441 South Air Park Place
Anchorage, Alaska

SUBJECT: DAIRY INDUSTRY

Dear Mr. Heath:

I would first like to thank you for taking the time to see me today. All involved in the dairy industry owe a special thanks to Senator Kerttula for asking Governor Sheffield to appoint you as the person responsible for assessing the Matanuska Maid situation. I believe you will find a solution to the current morass that exists in the dairy industry.

I will briefly restate the situation and the resolution as I see it.

The solution to Matanuska Maid's problem is not increased debt, but rather less debt. Increased debt will only add to the problems and delay the solutions.

The first step is to immediately initiate a viable plan to reorganize and get out of Chapter 11. This plan of reorganization must require all parties to make economic sacrifices, namely:

- 1) the producers shall receive only as much for their milk as the dairy can pay and break even;
- 2) the state shall write off all accrued interest on existing debts and give the dairy a moratorium on future interest and principal payments;
- 3) the unsecured creditors shall only receive about 60% of their total claims, and
- 4) the prior producers shall receive no money for 2% certificates.

A piecemeal approach to solving the problems will not work. All groups must make the hereinabove sacrifices; otherwise, the dairy cannot compete in the competitive market that currently exists.

A consulting report is currently being prepared by Ed Owens, State Director, Washington State University, Small Business Development Center. This \$40,000 study was requested by bank cooperatives to evaluate Matanuska Maid. The study is a detailed analysis of the feasibility of reorganizing Matanuska Maid. Among other things the report will include an in-depth review of Matanuska Maid's financial systems and procedures, management and marketing procedures, and strategy. In my discussions with Ed Owens he feels that with proper management Matanuska Maid can be very successful and profitable. It is imperative, in my opinion, that the recommendations made in this report be evaluated and implemented immediately by the Board of Directors.

I further believe the state must address the problems NOW that exist in the producer area. As we all know, the producer cannot survive without an efficient dairy -- and the dairy cannot survive without efficient producers. If we only resolve the problems of the dairy, and don't address both producer and dairy, then the time will come when we will have the same emergency situation at the producer level. What good is one without the other?

The dairy has been paying the producer a price higher than what it could afford to pay and still break even. This overpayment has been absorbed by an increase in debt and continual erosion of prior years' equity. The producer was receiving approximately \$3.00 CWT more for his milk than the dairy could afford to pay. Since the producer was getting his check, he wasn't concerned about the processor -- and "no one was watching the store".

In 1980 when the Point MacKenzie project was initiated, the idea was to create a number of small family dairies. In reality, however, this concept does not work, nor is it what has actually happened. For example, of the farms actually under construction, or in production, the situation is as follows:

Lees	-	Subsidized by other business ventures
James	-	Subsidized by medical practice
Rodgers	-	Backed by Anchorage restaurant
Tucker	-	Backed by cooperative effort of 4 separate dairies
Johnson	-	Backed by his contracting business
Basken	-	Possible family dairy

The cash equity requirement of nearly \$200,000 to build even the smallest farm is a prohibitive sum for most family farms. Therefore, many families cannot even get started.

Currently at Point MacKenzie there are two dairies on line and four more under construction. The two operating dairies are in serious financial trouble, and the remaining 16 need help desperately.

If the producer is going to survive, immediate changes must be made. These are as follows.

1. Combining of up to four parcels into one farm.

Both the initial cost and the operating costs of larger facilities create lower per-unit prices. Based upon recent cost data it costs \$15,000 per cow for a 100-cow dairy compared to \$8,000 per cow for a 360-cow dairy. In addition, the operating costs of a 100-cow dairy are 25% higher than a 360-cow dairy.

As in any business, economy of scale produces lower per unit costs. The Department of Agriculture must allow consolidations of parcels to allow more efficient and competitive units while at the same time enforcing the total stocking requirements.

2. Increase lending limits to \$7,500 per cow, or up to \$2,000,000 per farm.

The industry needs additional financing to be efficient. The costs of even a 120-cow dairy are upwards of \$1,600,000. The current loan limit of \$1,000,000 is not enough. The current operators cannot bridge the gap between costs and available loan limits. The savings created for the state loan program by having fewer dairies should be allocated to existing and future dairies so they can build efficient units rather than under-funding them as is now the case. The state is much better off to have \$1,500,000 lent to one 200-cow facility than \$3,000,000 lent to three 70-cow facilities. The total cost to the state is less under this scenario than the one currently being pursued.

3. Funds to promote in-state products.

Because of the controlled retail environment that our milk products are competing in, we must promote our local milk products to the consumer. The state has a large financial investment, as well as a long-term responsibility, to see that the industry survives. The state should allocate upwards of \$200,000 to promote local products. Because of the current financial problems of the processing plant, these funds must come from the state. This is a small investment compared to the future returns.

4. The state must adopt a law that establishes a maximum 10-day shelf life from the date of process.

The state of Hawaii has recently adopted such legislation to enhance its local dairy industry.

5. Moratorium on interest and principal for 4 years.

The current reduction in milk prices of \$3.00 CWT cannot be absorbed by the producer at this time. The industry will need time to adjust to this reduction in revenues. All existing and proposed farms use the current \$21.40 CWT price, not the new \$18.35 CWT price.

I believe the situation for the producer is just as precarious as the dairy, but not yet as obvious. If the dairy industry is to survive, we must have a change of policies at the Department of Agriculture. A dairy industry failure will have long-range damaging implications to all other areas of agriculture. I believe it is not too late to make necessary changes. Changes are needed in policies and directions by the state to save the dairy industry.

We must go forward, we cannot turn back. Too much is at stake here -- we cannot stop the flow of milk from the existing 900 dairy cows currently in production.

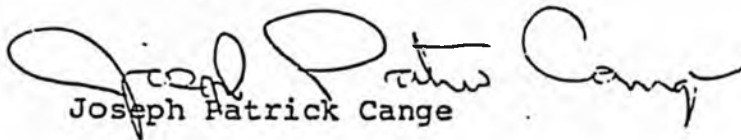
6/22/84

The state has invested significant tax-payer capital in the development of several agriculture-based industries -- such as the barley and red meat industry. Should the dairy industry fail, the other agricultural industries will be seriously impacted.

Although the situation seems bleak -- it is not hopeless. I believe with proper assistance and directional change from the state we can create a successful dairy industry in Alaska.

Thank you for your time and consideration in this matter. I am presently doing a cost analysis of various sized dairies and I will forward a copy to you as soon as it is completed. If I can be of any further assistance, please give me a call.

Sincerely,


Joseph Patrick Cange

cc: Governor Bill Sheffield
Richard A. Lyon
Bill L. Heins
Jalmar M. Kerttula
Esther C. Wunnicke
Pappy Moss
Mike Szymanski

EXHIBIT G

JOSEPH PATRICK CANGE
CERTIFIED PUBLIC ACCOUNTANT
BOX 4-847
ANCHORAGE, ALASKA 99509
TELEPHONE (907) 344-5800

September 14, 1984

Ms. Dean Brown
Deputy Director
State of Alaska
Department of Natural Resources
Division of Agriculture
P.O. Box 949
Palmer, Alaska 99645-0949

SUBJECT: article in The Anchorage Times, September 14, 1984
Brown disagrees with the premise that larger is more economical, saying that state statistics show the smaller, family-run dairy as the most economical farming unit. They require less sophisticated equipment and don't rely on hired labor, she said.

Dear Ms. Brown:

I certainly enjoyed your comments as reported in The Anchorage Times on this date. My brother and I own a parcel at Point Mackenzie and we would like to ask you a few questions, in your official capacity as Deputy Director, regarding the agriculture industry.

Regarding your statement "that state statistics show the smaller, family-run dairy as the most economical farming unit"

1. In your capacity as Deputy Director is this your personal philosophy?
2. Is this philosophy an official department philosophy, and if so, who else in the department subscribes to this theory?
3. Are there any written policy documents postulating this theory? If so, please send us a copy.

ADVIS,
THIS LETTER
ASKS MANY
IMPORTANT
QUESTIONS
THAT
SHOULD
BE
ANSWERED

Ms. Dean Brown
September 14, 1984
Page Two

4. What economic data is your statement based upon? Please provide us with your detailed economic data.

5. Does the fact that in 1960 there were 80 Grade A dairies whereas today there are only 9 Grade A dairies provide support for your position? How do you account for this decrease in "smaller, family-run dairies"?

6. Does your economic data supporting the "smaller, family-run dairies" include cost of housing? If not, where should the families live? How much would a minimum-sized family home cost?

7. On September 11, 1982 what price was the dairy farmer receiving for his milk? What is he receiving today? How would a reduction in the price of milk from \$22.60 per cwt to \$19.50 per cwt effect your economic data?

8. Does your economic data include any expenditure for agriculture equipment for planting and harvesting of crops? If so, how much? If not, what would it cost to acquire this equipment per farm?

9. What is the ideal size of a "smaller, family-run dairy" (a) based upon your economic data, and (b) based upon your personal economic data?

10. How many "smaller, family-run dairies" are currently producing milk at Point Mackenzie? What are the total number of cows currently producing milk as of this date from the "smaller, family-run dairies"?

11. Have you read the report dated July 10, 1984 prepared by Ed Owens, State Director, Washington State University, Small Business Development Center? If you have, do you feel that the report has any value or validity?

12. Please inform us as to your views on the economic theory related to economies of scale, particularly related to the dairy industry. Does this theory apply in the dairy industry? If not, explain why not.

Ms. Dean Brown
September 14, 1984
Page Three

13. Do you agree with the statement by Milburn Tucker (Anchorage Times, 9/14/84) that the larger dairy, because of its large capital requirements, will help encourage continued dairying at Point Mackenzie? If not, please explain how this could not be true.

14. Do you think that a successful and profitable dairy industry will insure that Point Mackenzie parcels remain agriculture? If you do not, please explain what will happen to the Point Mackenzie parcels if the dairy industry fails. Do you feel that there is any relationship between economically viable dairies at Point Mackenzie and the continued use of the 31 parcels as agriculture?

15. What have you done in your position as Deputy Director to insure a success at Point Mackenzie?

16. In your position as Deputy Director, what do you see as the primary problems existing at the Point Mackenzie dairies and what solutions have you proposed?

17. Which Point Mackenzie farmers have you communicated with since January 1, 1984, and what are the farmers main points of concern? What positive actions have you taken to resolve their problems and concerns?

18. Is it more important to keep the "smaller, family-run dairies" or to produce milk at the lowest price per cwt?

19. Based upon your economic data, how much initial capital would a "smaller, family-run dairy" require?

20. Do you think that the change in the Point Mackenzie project as initially set up (January 2, 1981) and the way the final lottery was done (September 11, 1982) has had any effects on your concept of the "smaller, family-run dairies"?

21. In your opinion, are there any advantages to the larger dairies?

Ms. Dean Brown
September 14, 1984
Page Four

22. If your theory of the "smaller, family-run dairies" being better than larger dairies is true, why wouldn't it make sense to have 20 smaller, family-run creameries rather than one large creamery?

23. How important is it to the dairy industry as a whole and to the state that Point Mackenzie succeed?

24. Do you believe that there is any interrelationship and/or interdependence between the Delta Barley project, Point Mackenzie project, and the Red Meat Industry? If so, please explain.

25. Do you believe that a failure at Point Mackenzie would have impacts on future planned agricultural projects such as Fish Creek, Moose Creek, Doshka Flats, Chulitna and Nenana?

26. How much has the state invested over the last ten years to agriculture in:

- a) loans
- b) loans written off
- c) value of land set aside for agriculture
- d) administrative costs for the Department of Agriculture.
- e) University of Alaska experimental work?

27. How important is the agriculture industry to the state?

28. How important is it that the dairy industry produce milk at costs that will make Alaskan milk products competitively priced with Lower-48 milk products?

29. Do you feel that the dairy industry is currently very financially strong? If not, please explain why.

30. How important is it to the long-term success of the dairy industry that state loan funds be used to generate the most revenue per dollar lent?

31. If the combining of parcels can create lower capital costs per cwt, would this help reduce fixed cost per cwt of milk produced?

Ms. Dean Brown
September 14, 1984
Page Five

32. On some loans the Alaska Revolving Loan Fund Board has required applicants to share management and use of facilities on adjoining parcels. If this results in lower capital outlays and lower operating costs, does this make sense to you?

33. Do you agree or disagree with the following statement "The major objectives (of the Point Mackenzie project) are to stimulate in-state milk production, to provide milk to Alaskan consumers at a competitive market price."

34. How important is natural gas to the Point Mackenzie project? What have you done as Deputy Director to help obtain natural gas?

35. What have you done as Deputy Director to guarantee that Point Mackenzie obtains the most out of the \$3,100,000 grant for electricity? How are you overseeing the administration of these funds?

36. Regarding your statement "they require less sophisticated equipment and don't rely on hired labor"

a) What particular pieces of sophisticated equipment do you dislike?

b) Do you dislike all sophisticated equipment, or just sophisticated equipment in the dairy industry?

c) Why do you dislike sophisticated equipment?

d) Why do you dislike hired labor?

e) Do you dislike all hired labor, or just in the dairy industry?

f) Do you believe that our modern trend to specialization of labor is undesirable? What are your thoughts regarding specialization within the dairy industry?

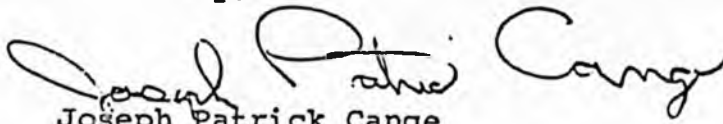
g) Do you see any long-term advantage to having professionally managed corporate dairies as compared to the "smaller, family-run dairies"?

Ms. Dean Brown
September 14, 1984
Page Six

h) . How many cows would the "smaller, family-run dairies" milk? What is their detailed personnel schedule?

We would appreciate your immediate response to these questions as we feel they are critical to our analysis of the long-term success or failure at Point Mackenzie.

Sincerely,


Joseph Patrick Cange

cc: Governor Bill Sheffield
Richard A. Lyon
Bill Heim
Jalmar M. Kerttula
Esther C. Wunnicke
Pappy Moss
Mike Szymanski

EXHIBIT H

P.O. Box 4-647
Anchorage, Alaska 99509
January 17, 1985

Mr. James K. Barnett
Deputy Commissioner
Alaska Department of Natural Resources
555 Cordova Street
Pouch 7-005
Anchorage, Alaska 99510

Re: Consolidation of Parcels
116, 117, 123, and 124 into one farm

Dear Mr. Barnett:

The four owners of the hereinabove described parcels are asking that the four parcels be permitted to consolidate into one farm. After a very thorough economic analysis we made the decision in late 1983 to work jointly to build one large efficient facility rather than build four separate smaller ones. Thus, we combined our capital, time, and management expertise to create one large and economically efficient dairy. The reasons for this decision are as follows:

1. Through consolidation the capital investment per cow was 32% lower for one dairy than for four separate dairies. By pooling our economic resources we capitalized the dairy with \$1,000,000 cash. The capital requirements are so great that if each person had attempted to build a separate, small dairy, none of us would be operational at this time. However, through this cooperative effort, we are currently producing 12,000 lbs. of milk per day.
2. The operating costs including interest expense per cwt of milk produced are 26% lower on the one large dairy when compared to four smaller dairies. The economies of scale of the larger dairy will, therefore, make us competitive with outside milk.
3. None of the four parcel owners had much experience in the dairy industry; therefore, it was imperative that we secure a competent dairy manager to insure a successful well-managed

Mr. James K. Barnett
January 17, 1985
Page 2

operation. By building one large dairy we were able to attract and hire one of the leading dairymen in the country. A single, small dairy could not have afforded the compensation necessary to attract a good dairy manager.

4. We recognized that Matanuska Maid's bankruptcy filing, and a reduction in milk prices (from \$22.60 per cwt to \$19.00 per cwt) would require that we be able to produce milk at a price lower than \$19.00 per cwt. We could only do this by combining our parcels.

The Point MacKenzie sale brochure dated September 11, 1982 states on Page 1 "The major objectives are to stimulate in-state milk production to provide milk to Alaska consumers at a competitive market price, and to assist in gaining agricultural self-sufficiency for the State of Alaska."

The required minimum stocking of these four parcels by November 1, 1985 is 173 cows. We currently have 367 cows, more producing cows than all the other Point MacKenzie producers combined.

Having experienced the complete process of getting a dairy on line, none of us (the four parcel owners) would ever consider building separate, smaller dairies. We are viable and in production now only because we have consolidated the parcels.

The benefits to the state and the industry are many. We have attached a letter from John Seawell (Exhibit A) that shows our 367 cows are earning the creamery \$12,845 per month. The consolidation will eliminate the duplication of capital and thus require less of ARLF funds. The existing funds available for agricultural lending are quite limited. In fact, the request for a separate loan on Parcel 116 has been postponed by the ARLF Board because of apparent lack of funds.

Lower capital requirements and lower operating costs create competitively priced agricultural products. To prove this point, we have also attached a letter and study from a leading authority on dairy farming (Exhibit B) which points to lower investment and lower operating costs on larger dairies versus smaller dairies.

Mr. James K. Barnett
January 15, 1985
Page 3

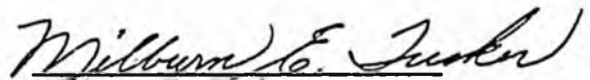
We are making an official request of the Director of the Division of Land and Water Management, with the consent and concurrence of the Commissioner of the Department of Natural Resources, to amend our CONTRACTS FOR THE SALE OF AGRICULTURAL INTEREST IN STATE LAND to permit a consolidation of Parcels 116, 117, 123, and 124 into one farm. With the November 1st contract date only nine months away, we would like to accomplish the consolidation as soon as possible.

It is imperative for the long-term success of the industry that the Department of Natural Resources demonstrate initiative and foresight in its policies to do those things that make the industry viable and competitive. Let's not live by yesterday's standards: let's be progressive. Now is the time to do the things that these competitive times demand.

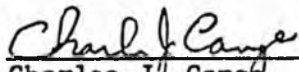
Sincerely,



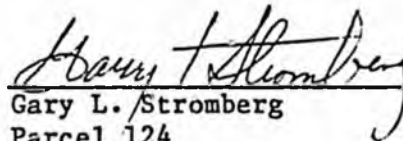
Evander C. Smith
Parcel 116



Milburn E. Tucker
Parcel 117



Charles J. Cange
Parcel 123



Gary L. Stromberg
Parcel 124

attachments

cc: Bill Heim
Esther C. Wunnicke



Matanuska Maid, Inc.

814 W. Northern Lights Blvd.
Anchorage, Alaska 99503
(907) 561-5223

December 4, 1984

Mr. Joseph P. Cange
P.O. Box 4-647
Anchorage, Ak. 99509

Dear Mr. Cange:

You asked us two questions. Your questions and our best judgment answers are:

1. The question: What is the economic value to the Matanuska Maid Creamery of each new producing cow brought on stream in the Palmer/Pt. MacKenzie Area?

Our Answer: Our projections indicate that an increase of 1075 producing cows (the number required to bring total production up to our single shift processing capacity) will generate a monthly operating cash flow increase of approx. \$37,500. Based on that, the value of each new local producing cow to the Creamery is \$35.00 per month.

2. The question: How much milk can Matanuska Maid sell without depressing the market?

Our Answer: We believe it would be unrealistic to think local milk could acquire over one half the rail belt market without depressing prices. At Mid-Summer 1984, Matanuska Maid was supplying about 27% of a 64,000 CWT monthly market.

We anticipate the market growing to about 71,000 CWT per month by Mid-1986 and believe up to 35-36,000 CWT can be processed locally without depressing prices. That quantity would require about 3,000 producing cows.

Very truly yours,


John L. Seawell

EXHIBIT A

A FARMER OWNED COOPERATIVE



United States
Department of
Agriculture

Economic
Research
Service

XED, University of Minnesota
217 Cla Off Bldg, 1996 Buford Ave.
St. Paul, Minnesota 55108

November 28, 1984

Mr. Joseph Patrick Cange
Certified Public Accountant
Box 4-647
Anchorage, Alaska 99509

Dear Mr. Cange:

In response to your letter of October 31, 1984, I have enclosed a preliminary draft report recently completed. The capital costs estimated for twenty-two dairy operations in the lower 48 states are summarized in Table 4, page 15. The budget information is for "whole" farm situations and include some operations that produce most of the feed within the farm. By looking at alternative size herds within each state, some idea of how capital costs per cow change on alternative size farms can be evaluated. Table 4 breaks capital costs down into six categories such as dairy buidlings and equipment. This may help you pick the most relevant figures for your purposes.

The results do indicate lower investment on larger farms than on smaller farms especially up to the 500 or 600 cow herd sizes. Perhaps the New York farms would be most relevant to the Point MacKenzie project as those farms use free stall housing, produce most of the forage requirement and 52-, 200-, and 600-cow operations are considered.

I enjoyed meeting with the group representing the Point MacKenzie area and also wish we had had more time to discuss the farm issues.

Sincerely,

Boyd M. Buxton
Agricultural Economist

BMB/dmm

Enclosure

EXHIBIT B