

The Value of Milk Components

The complexity of our milk pricing and quota systems makes it very difficult to determine the most profitable quota investment, milk output and component production for your herd. The recent change to multiple component pricing (MCP) for industrial milk has many producers thinking that their objective should be high-protein, low-fat milk. Although that might be the case for the industry as a whole, your individual targets will be determined by your particular quota position.

Consider the following 3 scenarios which might apply to the last 3 months of the quota year. All are based on a herd of 75 cows producing an average of 30 litres/cow/day at 3.65 kg/hl fat, 3.25 kg/hl protein and 5.6 kg/hl other solids. Other assumptions are summarized in table 1.

Scenario 1: Fluid quota with MSQ

Most Alberta producers own both fluid quota and MSQ. In this example, a shipper holds 1,125 litres of fluid quota with an MSQ balance on May 1 of 3,928 kg. Total volume production for the final 92 days of the dairy year is allocated as follows:

Total volume (30 x 75 x 92)	=	207,000 litres
Class 1 (1,125 x 92 x 90%)	=	93,150 litres
Exclusion (6.7% x Class 1)	=	6,241 litres
Excess	=	107,609 litres

The allocation of milk components is dictated by the average levels of fat, protein and other solids currently being marketed in Class 1 products:

Fat:		
Total (3.65 x Total volume hl)	=	7,556 kg
Class 1 (2.4 x Class 1 hl)	=	2,236 kg
Industrial:		
Class 1 Skimoff		
((3.65 x Class 1 hl) - Class 1 fat)	=	1,164 kg
Exclusion (3.65 x Exclusion hl)	=	228 kg
Excess (3.65 x Excess hl)	=	3,928 kg
Protein:		
Total (3.25 x Total volume hl)	=	6,728 kg
Class 1 (3.3 x Class 1 hl)	=	3,074 kg
Industrial (Total - Class 1)	=	3,654 kg
Other Solids:		
Total (5.6 x Total volume hl)	=	11,592 kg
Class 1 (5.7 x Class 1 hl)	=	5,310 kg
Industrial (Total - Class 1)	=	6,282 kg

Fluid Utilization	90	%
Exclusion Factor	6.7	%
Current averages:		
Class 1 fat	2.4	kg/hl
Class 1 protein	3.3	kg/hl
Class 1 other solids	5.7	kg/hl
Prices :		
Class 1 volume	45.50	\$/hl
Class 1 fat	5.30	\$/kg
Industrial fat	5.22	\$/kg
Industrial protein	5.00	\$/kg
Industrial other solids	1.90	\$/kg
Export fat	1.75	\$/kg
Export protein	2.25	\$/kg
Export other solids	2.05	\$/kg

Table 1 : Assumptions used in calculations.

Table 2 shows the effects of changing fat and protein tests on net revenue. Notice that a change in fat test from 3.35 to 3.65 kg/hl produces a \$1.56/hl increase in net revenue. But, when fat test increases above 3.65 kg/hl, there is no MSQ to cover the additional fat and components flow into the export pool. The increased net revenue when fat test increases from 3.65 to 3.95 kg/hl is only 67-72¢ due to the lower 'world' price obtained for export components.

At a 3.95 kg/hl fat test, the 323 kg of fat which receives world price represents 3.95% of total fat production. The same proportion of total protein and other solids follow fat into the export pool. For example, at a protein test of 3.25 kg/hl, total

milk protein kg/hl	milk fat kg/hl				
	3.05	3.35	3.65	3.95	4.25
--- milk net revenue \$/hl shipped ---					
3.05	47.25	48.80	50.36	51.08	51.83
3.15	47.75	49.30	50.86	51.56	52.31
3.25	48.25	49.80	51.36	52.05	52.79
3.35	48.75	50.30	51.86	52.54	53.27
3.45	49.25	50.80	52.36	53.03	53.75
MSQ unused	646	323	0	0	0
Export fat	0	0	0	323	646

Table 2 : Effects of fat and protein tests on milk net revenue for scenario 1: 1,125 litres of fluid quota; 3,928 kg MSQ balance on May 1.

protein production is 6728 kg (3.25 x (2070 hl)) and 3.95% of this (266 kg) will receive the world protein price. Notice that a 0.1 kg/hl increase in protein test returns an additional 50¢/hl when fat test is 3.65 kg/hl or lower. But, at the higher fat tests, the return to the same incremental increase in protein is slightly lower.

Scenario 2: All MSQ, no fluid quota

MSQ holdings of 7,556 kg would allow you to obtain industrial prices for all 207,000 litres at a 3.65 kg/hl fat test. As in scenario 1, when fat production exceeds MSQ balance (above 3.65 kg/hl), the excess fat flows to the export pool, carrying protein and other solids with it. But in this case, the lower price paid for those components results in declining net revenue per hl at the higher fat tests (see table 3). Maximum return on quota investment is achieved by shipping exactly 100% of MSQ at year-end.

Scenario 3: All fluid quota, no MSQ

This scenario represents a shipper who owns 2,250 litres of fluid quota with no unused MSQ remaining on May 1. It is no longer necessary to purchase MSQ to cover the milk not utilized for Class 1 products. However, fat skim-off from Class 1 shipments as well as exclusion fat still flow into the domestic industrial market and receive the industrial price. Additional fat and equal proportions of protein and other solids enter the export pool, for which world prices are paid.

Table 4 summarizes effects of fat and protein tests on net revenue for this scenario. Because a constant proportion of total fat production flows to the export pool, increase in net revenue is the same for each incremental increase in fat test. Although high fat tests significantly increase net milk cheque revenues for shippers holding high proportions of fluid quota, year-end skim-off assessment will also increase.

milk protein kg/hl	milk fat kg/hl				
	3.05	3.35	3.65	3.95	4.25
	--- milk net revenue \$/hl shipped ---				
3.05	54.79	56.31	57.82	59.33	60.85
3.15	55.28	56.79	58.31	59.82	61.34
3.25	55.77	57.28	58.80	60.31	61.83
3.35	56.26	57.77	59.29	60.80	62.32
3.45	56.75	58.26	59.79	61.29	62.80
Export fat	251	275	300	325	349

Table 4 : Effects of fat and protein tests on milk net revenue for scenario 3: 2,250 litres of fluid quota; 0 MSQ balance on May 1.

milk protein kg/hl	milk fat kg/hl				
	3.05	3.35	3.65	3.95	4.25
	--- milk net revenue \$/hl shipped ---				
3.05	38.98	40.54	42.10	42.04	42.06
3.15	39.48	41.04	42.60	42.52	42.52
3.25	39.98	41.54	43.10	43.00	42.98
3.35	40.48	42.04	43.60	43.48	43.44
3.45	40.98	42.54	44.10	43.96	43.90
MSQ unused	1,242	621	0	0	0
Export fat	0	0	0	621	1,242

Table 3 : Effects of fat and protein tests on milk net revenue for scenario 3: 0 fluid quota; 7,556 kg MSQ balance on May 1.

Return on quota cost

The most noticeable differences between these 3 scenarios are the higher net revenues received when all, or a portion of total production is shipped under fluid quota. How do these revenues relate to the costs of owning quota? With unused MSQ at \$31/kg, scenario 2 would require an investment of \$113.16 per hl of milk shipped:

$$\frac{\$31}{\text{kg MSQ}} \times 7,556 \text{ kg MSQ} \\ \underline{\hspace{10em}} \\ 2,070 \text{ hectolitres total production}$$

At today's average cost of fluid quota (\$426/litre), scenario 3 would require an investment of \$116.71 per hl of milk shipped, calculated as follows:

$$\frac{\$426}{\text{quota litre}} \times \frac{92 \text{ days}}{365 \text{ days}} \times 2,250 \text{ quota litres} \\ \underline{\hspace{10em}} \\ 2,070 \text{ hectolitres total production}$$

Shipping milk containing 3.65 kg/hl fat, 3.25 kg/hl protein produced net revenues of \$43.10 vs \$58.80 per litre for the all-MSQ vs all-fluid scenarios, respectively. At the quota costs and milk prices used in these calculations, the return on investment in fluid quota is significantly better than that for MSQ.

These calculations do not account for the uncertain cost of skim-off. Based on assessments for the 1995-96 dairy year, skim-off attributable to the 92 days of production in scenario 3 (3.65 kg/hl fat test) might amount to approximately 226 kg of MSQ with a value of \$7006 (at \$31/kg for unused MSQ) or \$3.38 per hl of total production.

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