

Milk Production Cost Index (Figure 23 and 24)

- Since 1955, the Cost Index has been used as an accurate measure of change in the cost of producing milk. A Cost Index is published bimonthly for each of the five production areas. All costs are reported on a per hundredweight of milk basis and the milk is adjusted to 3.5% fat and 8.7% solids-not-fat.
- In addition to reporting costs for feed, labor and miscellaneous costs (herd replacement, taxes and insurance, operating costs and marketing costs), the Cost Index includes an allowance for return on investment and return for management.
- While the Cost Index provides a statewide weighted average of all costs and allowances for each bimonthly period, the previous bimonthly period and the bimonthly period the previous year, figure 23 contains area averages and a statewide average.
- A comprehensive explanation of each line item is included in the Glossary of Terms for the Cost Index (Figure 25).

Exhibit 31
Figure 24 - California
Milk Production Cost Index
1978, 1988, 1997 and 1998

Attachment
~~EXHIBIT~~ 1

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California Cost of Production Data 1

Market Milk - All costs per hundredweight of 3.5% / 8.7% milk					
California (Weighted Average)					
	1978	1988	1997	1998	
Average Dry Roughage Price per Ton	\$74.74	\$104.79	\$135.56	\$135.05	
Average Wet Roughage Price per Ton	\$18.90	\$26.79	\$33.49	\$32.14	
Average Concentrate Price per Ton	\$118.53	\$144.22	\$168.77	\$153.09	
Pounds T.D.N. Per Hundredweight @ 3.5%/8.7%	71.60	63.00	57.50	57.60	
Dry Roughage percent of Ration	35	31	27	25	
Wet Roughage percent of Ration	14	16	17	17	
Concentrate percent of Ration	49	52	55	57	
Pasture percent of Ration	2	1	1	1	
Dry Roughage Cost	\$1.78	\$1.97	\$1.96	\$1.85	
Wet Roughage Cost	\$0.61	\$0.79	\$0.97	\$0.90	
Concentrate Cost	\$2.78	\$3.07	\$3.63	\$3.43	
Pasture Cost	\$0.06	\$0.04	\$0.03	\$0.03	
Total Feed Costs	Subtotal (A)	\$5.23	\$5.87	\$6.59	\$6.21
Labor Costs	Subtotal (B)	\$1.08	\$1.32	\$1.31	\$1.38
Herd Replacement Cost 1/	\$1.06	\$1.11	\$1.40	\$1.46	
Taxes and Insurance	\$0.14	\$0.09	\$0.08	\$0.08	
Operating Cost	\$1.03	\$1.43	\$1.54	\$1.69	
Depreciation - Buildings and Equipment	\$0.18	\$0.28	\$0.32	\$0.34	
Marketing Cost	\$0.40	\$0.50	\$0.44	\$0.44	
Less: Miscellaneous Income	(\$0.21)	(\$0.28)	(\$0.19)	(\$0.19)	
Net Total Miscellaneous Costs	Subtotal (C)	\$2.60	\$3.13	\$3.59	\$3.82
Total Feed, Labor & Misc. Costs	(A+B+C)	\$8.91	\$10.32	\$11.49	\$11.41
Allowance: Return on Investment	\$0.93	\$1.41	\$1.23	\$1.25	
Allowance: Return on Management	\$0.50	\$0.52	\$0.62	\$0.73	
Total All Costs and Allowances		\$10.34	\$12.25	\$13.34	\$13.39
BASIC SURVEY INFORMATION:					
Cost per Cow per Day	\$4.18	\$6.26	\$7.48	\$7.49	
Pounds of Milk Produced per Cow per Day @ 3.5%/8.7%	40.40	51.10	56.10	55.90	

1/ Prior to 1998, Herd Replacement Cost was based only on the two-month period being reported. Beginning in 1998, Herd Replacement Cost is calculated on a 12-month rolling basis.

Figure 25 - Milk Production Cost Index Glossary of Terms

The Cost Index is a statewide weighted average of all costs and allowances for each bimonthly period, the previous bimonthly period and the bimonthly period for the prior year. All costs are reported per hundredweight of milk produced. The Cost Index is a measure of change in the cost of producing milk.

All milk produced is adjusted to 3.5 percent fat and 8.7 percent solids-not-fat (SNF) and identified as "milk" in the following definitions.

Average Dry Roughage Price per Ton - The total dollar cost of dry roughage fed divided by the total tons of dry roughage fed. Dry Roughage is defined as all forages low in moisture content and high in fiber, e.g., alfalfa hay, oat hay, sudan hay, almond hulls, etc.

Average Wet Roughage Price per Ton - The total dollar cost of wet roughage fed divided by the total tons of wet roughage fed. Wet Roughage is defined as all forages high in moisture content, e.g. corn, wheat and alfalfa silage, tomato pomace, haylage, brewers' malt, earlage, etc.

Average Concentrate Price per Ton - The total dollar cost of concentrate fed divided by the total tons of concentrate fed. Concentrate is defined as grain and minerals. Grain - products relatively high in energy and low in fiber, e.g. rolled corn and barley, whole cottonseed, etc. Minerals - includes mineral and vitamin supplements and feed additives that improve feed efficiency, e.g. molasses, limestone, bicarbonate, etc.

Pounds TDN Per Hundredweight @ 3.5%/8.7% - Total pounds TDN fed divided by "milk".

Dry Roughage percent of Ration - Total pounds of dry roughage TDN fed divided by total pounds of TDN fed.

Wet Roughage percent of Ration - Total pounds of wet roughage TDN fed divided by total pounds of TDN fed.

Concentrate percent of Ration - Total pounds of concentrate TDN fed divided by total pounds of TDN fed.

Pasture percent of Ration - Total pounds of pasture TDN fed divided by total pounds of TDN fed.

Dry Roughage Cost - Amount of ration expense attributed to dry roughage.

Wet Roughage Cost - Amount of ration expense attributed to wet roughage.

Concentrate Cost - Amount of ration expense attributed to concentrate.

Pasture Cost - Amount of ration expense attributed to pasture.

Figure 25 - Milk Production Cost Index
Glossary of Terms - continued

Total Labor Costs - Labor costs divided by "milk". Labor includes family and hired labor, salary, benefits and all employer taxes. ---

Herd Replacement Cost - The cost to replace a cow that was part of the milking herd. A twelve-month rolling average of the number and value of cows entering the herd, minus the total receipts for the same number of cows culled and dead.

Taxes & Insurance - Predetermined rate based on prior year actual costs.

Operating Cost - Total of general operating expenses, including, but not limited to: utilities, maintenance, repair, supplies and hired services, divided by "milk".

Depreciation - Buildings & Equipment - Total dollars of depreciation for dairy building and equipment divided by "milk". Straight-line depreciation on any equipment or buildings used in the dairy operation.

Marketing Cost - Cost to market a hundredweight of milk. Hauling charges, mandatory assessments and miscellaneous deductions.

- Hauling – Fees paid to haul milk from ranch to plant, plus any stop charges.
- Administrative Assessments – Dairy Marketing, Milk Pooling, and Milk & Dairy Foods Control, plus county health inspections.
- Promotional Assessments – California Dairy Council, California Milk Advisory Board, and National Dairy Promotion.
- Misc. Deductions – Includes any permits or third party component testing.

Less: Miscellaneous Income - Value per hundredweight of bull and heifer calves sold. (Either sold off ranch or to another enterprise).

Allowance: Return on Investment - Total dollars invested in land, equipment, building, herd inventory, and a standardized roughage inventory multiplied by the current interest rate paid on agriculture loans divided by "milk" per cow.

Allowance: Return on Management - Return allowed the dairy operator for skill and expertise in dairy management. (Five percent of the blend price of total milk marketed in the cost area).

Basic Survey Information:

Cost per Cow per Day - Total of all costs as related to production per cow per day.

Pounds of Milk Produced per Cow per Day @ 3.5 % / 8.7 % - Total pounds of "milk" produced, including that used on the ranch, divided by total number of milk cows, divided by number of days in the month.

Exhibit 31

Attachment
~~EXHIBIT~~ 2

Given Information

Milk Fat Content, %	3.5000
Crude Protein, %	3.1815
Casein as percentage of crude protein, %	78.0000
True Protein, %	2.9915
Casein as percentage of true protein, %	82.9540
Milk Casein, %	2.4816
Milk Serum Protein, %	0.5099
Milk Other Solids Content, %	5.6935
Milk Total Solids Content, %	12.1850
Fat Recovery in Cheese	0.9300
NonFat,NonCasein Solids Factor for VanSlyke Yield	1.0900
Casein to Fat Ratio	0.7090
VanSlyke Cheddar Cheese Yield at target % moisture, lb/cwt	9.9095
Fat in the Cheddar cheese, lbs	3.2550
True Protein in the cheese, lbs	2.3816
True Protein not in the cheese, lbs	0.6099
NASS Cheddar Price, \$/lb	1.3064
Cheddar Cheese Make Allowance, \$/lb of cheese	0.1702
Cheddar Cheese Composition	
Fat, %	32.8474
Protein, %	24.0333
Skim Portion, %	67.1526
Moisture, %	38.0000
Fat on Dry Basis, %	52.9797
Whey Solids Retained in the Cheese, %	0.3388
NASS Whey Powder Price, \$/lb	0.1917
Moisture Test of Whey Powder, %	3.2000
Whey Powder Make Allowance, \$/lb of whey powder	0.1370
Yield of Whey Powder at 3.2% moisture	6.1618
pounds of true protein in whey powder	0.6099
pounds of other solids in whey powder	5.3547



BUTTER AND POWDER YIELDS

The current Class 4a pricing formula incorporates two yield factors:

BUTTER: 1.2 lbs. of butter produced per lb. of butterfat
 NFDM: 0.99 lbs. of NFDM produced per lb. of SNF

The NFDM yield factors has been analyzed and recalculated several times since it was introduced into milk pricing formulas. The NFDM yield was set at 0.96 from 1968 to 1972. The yield factor was increased to 1.00 from 1972 to 1977 and then decreased to 0.99 from 1977 to present. Although the butter yield factor of 1.2 has been analyzed regularly, it has never been changed since it was adopted in 1955. The current yields of 1.2 for butter and 0.99 for NFDM were assessed and verified in 1990 using receipts and usage information obtained from two butter-powder operations.

The Department has received requests from the industry to review plant information that could be used to calculate yield factors and determine if the current factors continue to be appropriate. While the California Department of Food and Agriculture collects product yield data directly from most Cheddar cheese plants, it does not collect yield data from butter-powder plants. Thus, product yields have been computed from receipts and usage information obtained from the Department's plant cost studies.

Most of the butter-powder plants in California manufacture multiple products and buy and/or sell large quantities of cream, condensed skim and condensed buttermilk. Consequently, tracking milk components entering the plant as milk or some intermediate product and exiting the plant as finished and packaged products or as a plant loss is complex. The procedure used to obtain the yields simplifies plant receiving, processing and packaging activities, and the resulting figures should be treated as unrefined estimates of butter and powder yields.

Using 1996 receipts and usage figures from nine powder plants and eight butter plants, estimates of product yields were computed (Table 1). The yield factors accounted for losses of milk components within each plant. In 1996, these nine powder plants processed 95% of NFDM produced in California, and the eight butter plants processed 95% of the butter produced in California.

Butter yields among the eight plants showed little variability and were similar to the current yield factor of 1.2. The yield factors for powder, which included both NFDM and BMP, were similar among the nine powder plants (range: 1.0111 to 1.0406). However, individual yields for NFDM and BMP were more variable.

The current yield factor considers both NFDM and BMP, and the powder yield in Table 1 is consistent with that view. However, there may be some interest in the breakdown of total powder yield into NFDM yield and BMP yield. Seven of the nine powder plants processed BMP. Two

Table 1. Butter and Powder Yields for California Processing Plants

	<u>Butter Yield¹</u>	<u>Fat Loss²</u>	<u>Powder Yield^{1,3}</u>	<u>SNF Loss⁴</u>
<i>Number of Plants</i>	8	8	9	9
<i>Weighted Average</i>	1.2213	1.56%	1.0239	2.13%
<i>Low</i>	1.2079	1.00%	1.0111	1.11%
<i>High</i>	1.2341	2.41%	1.0406	4.16%

¹"Yield" refers to the amount of product obtained from a unit of fat or SNF.
²"Fat Loss" is the difference between the fat received at the plant and the fat contained in finished products, i.e., fat that is unavailable for use in finished products.
³"Powder Yield" is the sum of the individual plant nonfat dry milk and buttermilk powder yields.
⁴"SNF Loss" is the difference between the SNF received at the plant and the SNF contained in finished products, i.e., SNF that is unavailable for use in finished products.

of the seven plants produced considerably higher percentages of BMP than the other five plants, a result of receiving large quantities of cream. If these two plants were included in the analysis, the considerable variations in NFDN and BMP production would not allow for meaningful and representative yield estimates of individual powder products obtainable from farm milk. Consequently, these two plants were omitted. The five remaining plants accounted for 67% of the NFDN and 61% of the BMP processed in California in 1996.

Among the five plants included in the calculation, the yield for NFDN ranged from 0.9309 to 0.9815 and the yield for BMP ranged from 0.0406 to 0.0749 (Table 2). Using an average weighted by production volume, the five plants obtained 0.9736 pounds of NFDN and 0.0521 pounds of BMP from a pound of milk.

Table 2. Powder, NFDN and BMP Yields for Select California Processing Plants^{1,2,3,4}

	<u>Powder Yield</u>	<u>NFDN Yield</u>	<u>BMP Yield</u>
<i>Number of Plants</i>	5	5	5
<i>Weighted Average</i>	1.0252 *	0.9736	0.0521
<i>Low</i>	1.0111	0.9309	0.0406
<i>High</i>	1.0406	0.9815	0.0749

¹"Yield" refers to the amount of product obtained from a unit of fat or SNF.
²"Powder Yield" is the sum of the individual plant nonfat dry milk and buttermilk powder yields.
³"NFDN" = nonfat dry milk.
⁴"BMP" = buttermilk powder.