

Draft of Whey Committee Answers to Questions Raised at the 12/28/07 Meeting

TO THE PERSON ADDRESSED:

At the whey review committee held on Friday, December 28, 2007, the Department received several requests for additional information. This document, with attachments, addresses these requests.

Questions:

1) What California manufacturing cost allowances were in effect from 1982 to present?

See Table 1.

2) What were the weighted average manufacturing costs for butter, nonfat dry milk, Cheddar cheese and dry whey from 1982 to present?

See Tables 2a and 2b.

Table 2a displays the historic summary of manufacturing costs data from 1986 through 2006. This table displays the weighted average manufacturing cost data.

Prior to 1986, the department published manufacturing cost data in a different format. The department published the actual processing cost of individual plants but did not reveal plant identifies. At that time, the weighted average manufacturing cost data was not published.

Hence, Table 2b does not use the weighted average costs of each study. Instead, it shows the weighted average costs for the twelve months calendar period; if a plant was not on a calendar year basis, an average was taken of the costs from the two studies..

3) What were the federal manufacturing cost allowances from their commencement to present?

See Table 3 and Appendix I.

Prior to 2000, federal orders did not use end product pricing. Therefore, there were no manufacturing cost allowances before that date.

4) Is there any available manufacturing cost data relative to WPC or whey protein isolates?

This information is collected from less than three plants. Therefore, it can not be released as this would violate the confidentiality rule.

5) Is it possible to breakout the whey protein isolate production data presented on p.17 of the handout material?

It is not possible to break down the whey protein isolate production data. Dividing it into categories would result in data compiled from less than three plants, which would violate confidentiality rules.

6) On page 24 of the Panel Report for the October 2007 hearing, the following statement occurs:

“In 2006, Class 4b utilization was 1,623 million pounds of SNF. A reasonable estimate is that 1,086 million pounds entered the whey stream. Based on production in 2006, dry forms of whey (including animal feed) accounted for 754 million pounds of SNF. Thus, 332 million pounds of SNF, 31 percent of the total, were not recovered.”

What were the assumptions and calculations used to determine that 31% of the SNF was not recovered in whey?

There are different methods to estimate the loss of SNF from the whey stream. Three methods are presented here:

- Estimate of the minimum possible loss based on the number of plants not making a dry form of whey
- Estimate of actual loss based on the yields in the Class 4b pricing formula
- Estimate of actual loss based on assumed parameters in the van Slyke formula

Minimum possible loss (see Table 4)

In the four months from May through August 2007, 61 plants made cheese; of these, only 14 made a dry form of whey. The other 47 plants that did not process their whey accounted for 10.5% of the milk received. Therefore, at least 10.5 percent of the SNF in the combined whey stream of all 61 plants is not recovered. Assuming a two to three percent plant loss, at least 12 to 13 percent of the SNF in the combined whey stream of all 61 plants is not recovered.

SNF recovered in dry forms of whey (see Table 5)

The amount of SNF recovered in dry forms of whey is used both in the estimate of actual loss based on the parameters in the Class 4b pricing formula and in the estimate of actual loss based on the parameters in the van Slyke formula. The Department estimated this SNF by using the total pounds of the five dry forms of whey produced by plants receiving pooled milk. (Data previously released by the Department included product produced by plants receiving milk not participating in the pool.) The pounds of these five products were multiplied by representative estimates of the SNF tests in each. The result for 2006 was an estimate of 757 millions pounds of SNF in dry forms of whey.

Loss based on pricing formula parameters (see Table 6a)

This method, as well as the method in the next section, estimates the total SNF in the whey stream. This is compared to the 757 millions pounds of SNF recovered in dry forms of whey (see *Table 5*).

Assumptions:

- 8.8 percent vat SNF
- 5.8 pound yield of dry whey from a hundredweight of milk testing 8.8 percent SNF and 3.72 percent fat
- Dry whey is 95.7 percent SNF = 0.957 (*Table 5*)

Data:

- 1,622,573,776 pounds of Class 4b SNF pooled in 2006
- 756,909,602 pounds of SNF recovered in dry forms of whey (*Table 5*)

Calculations:

- 5.55 SNF in dry whey = 5.8×0.957
- 63.08 percent SNF to whey = $0.6308 = 5.55 \div 8.8$
- 1,023,438,409 SNF in whey stream = $0.6308 \times 1,622,573,776$
- 266,528,808 SNF not recovered = $1,023,438,409 - 756,909,602$
- **26.04 percent SNF not recovered** = $266,528,808 \div 1,023,438,409$

Loss based on van Slyke formula parameters (see *Table 6b*)

This method is similar to the previous method, but the use of the van Slyke formula requires more assumptions and is much more complicated. The SNF in the whey stream is not calculated directly. Instead, the SNF captured in the cheese is estimated and the SNF in the whey stream is determined as a residual. Again, the estimate of the total SNF in the whey stream is compared to the 757 millions pounds of SNF recovered in dry forms of whey (*Table 5*).

Assumptions:

- 8.8 percent vat SNF
- 34.5 percent of SNF is protein = 0.345
- 78 percent of protein is casein = 0.78
- 0.1 percent of casein lost to whey
- 1.09 factor representing the lactose and whey protein retained in cheese moisture
- 10.2 pound yield of Cheddar cheese from a hundredweight of milk testing 8.8 percent SNF and 3.72 percent fat
- 38 percent of finished Cheddar cheese is moisture = 0.38

Data:

- 1,622,573,776 pounds of Class 4b SNF pooled in 2006
- 756,909,602 pounds of SNF recovered in dry forms of whey (*Table 5*)

Calculations:

- $3.03 \text{ pounds of protein in vat} = 8.8 \times 0.345$
- $2.37 \text{ pounds of casein in vat} = 3.03 \times 0.78$
- $2.27 \text{ pounds of casein in cheese} = 2.37 - 0.1$
- $6.32 \text{ pounds of total solids (fat and SNF) in cheese} = 10.2 \times (1.00 - 0.38)$
- $0.52 \text{ pounds of lactose and whey protein retained in cheese moisture} = (6.32 \div 1.09) \times (1.09 - 1.00)$
- $2.79 \text{ total SNF in cheese} = 2.27 + 0.52$
- $6.01 \text{ total SNF in whey stream} = 8.8 - 2.79$
- $68.31 \text{ percent SNF to whey} = 0.6831 = 6.01 \div 8.8$
- $1,108,317,145 \text{ SNF in whey stream} = 0.6831 \times 1,622,573,776$
- $351,407,543 \text{ SNF not recovered} = 1,108,317,145 - 756,909,602$
- **$31.71 \text{ percent SNF not recovered} = 351,407,543 \div 1,108,317,145$**

**Table 1 - History of CDFA Manufacturing Cost Allowances (MCA)
1980 to 2007**

Effective Date	Salted Butter	NFDM	Cheddar Cheese	Whey Butter	Dry Whey			
1980 Nov	\$0.0880	\$0.1655	Prior to August 1983, there was a single Class 4 price based on butter and NFDM commodity prices. The Class 4 price applied to all manufactured products.					
1982 Apr	\$0.1080	\$0.1865						
1983 May	\$0.1110	\$0.1935						
1987 Jun	↓	\$0.1832	From August 1983 through August 1988, the Class 4b price was set equal to the Class 4a price. The Class 4a price continued to be based on butter and NFDM commodity prices.					
1988 Sep	↓	\$0.1780						
1989 Jul	\$0.0970	\$0.1600	From October 1989 through March 1996, the cheese MCA varied based on the ratio of the CME cheese price to the Support Purchase Price for cheese.					
1996 Apr	↓	\$0.1400				\$0.1800	\$0.0970	----
1997 Nov	↓	↓				\$0.1690	↓	----
2002 Jan	\$0.1020	\$0.1610	\$0.1760	\$0.1020	----			
2003 Apr	\$0.1320	\$0.1500	\$0.1750	\$0.1320	\$0.1700			
2005 Apr	\$0.1560	\$0.1520	\$0.1710	\$0.1560	\$0.2000			
2006 Nov	↓	\$0.1600	\$0.1780	↓	\$0.2670			
2007 Dec	↓	\$0.1698	\$0.1988	↓	----			

Table 2a - Historic Summary of CDFA Processing Cost Studies

**Weighted Average Costs and Number of Participating Plants
Salted Butter, Nonfat Dry Milk, Cheddar Cheese and Dry Whey, 1986 to 2007**

Does not include updated costs for labor and utilities used at hearings

Study Period	Release Date	Salted Butter		Nonfat Dry Milk		Cheddar Cheese		Dry Whey	
		Cost Per Pound	Number of Plants	Cost Per Pound	Number of Plants	Cost Per Pound	Number of Plants	Cost Per Pound	Number of Plants
Periods	Nov 1986	\$0.0790	11	\$0.1455	13	--	--	--	--
Varied	Apr 1987	\$0.0781	11	\$0.1409	13	\$0.2450	6	--	--
↓	Jun 1988	\$0.0800	10	\$0.1377	11	\$0.2683	6	--	--
↓	May 1989	\$0.0879	11	\$0.1370	11	\$0.2251	9	--	--
↓	Jun 1990	\$0.0888	11	\$0.1398	11	\$0.2324	9	--	--
↓	May 1991	\$0.0883	10	\$0.1438	11	\$0.2192	9	--	--
↓	Jul 1992	\$0.0969	12	\$0.1443	12	\$0.2010	9	--	--
↓	Aug 1993	\$0.0936	12	\$0.1430	11	\$0.1868	10	--	--
↓	Sep 1994	\$0.0895	11	\$0.1341	11	\$0.1889	8	--	--
↓	Apr 1995	\$0.0889	9	\$0.1327	9	\$0.1862	8	--	--
↓	Nov 1995	\$0.0928	9	\$0.1328	9	\$0.1981	8	--	--
↓	Dec 1996	\$0.0970	9	\$0.1333	9	\$0.1898	8	--	--
↓	Jul 1997	\$0.0958	8	\$0.1327	9	\$0.1840	9	--	--
↓	Feb 1999	\$0.0930	8	\$0.1277	9	\$0.1759	10	--	--
↓	Feb 2000	\$0.0957	8	\$0.1356	10	\$0.1693	9	--	--
July 00-Dec 01	Nov 2002	\$0.1208	7	\$0.1619	11	\$0.1775	9	--	--
Jan-Dec 2002	Nov 2003	\$0.1235	7	\$0.1464	10	\$0.1632	9	--	--
Jan-Dec 2003	Nov 2004	\$0.1299	7	\$0.1560	10	\$0.1706	9	\$0.2675	4
Jan-Dec 2004	Nov 2005	\$0.1368	8	\$0.1543	10	\$0.1769	7	\$0.2673	3
Jan-Dec 2005	Nov 2006	\$0.1408	8	\$0.1659	9	\$0.1914	7	\$0.2851	3
Jan-Dec 2006	Sep 2007	\$0.1373	7	\$0.1664	8	\$0.1988	7	\$0.3099	3

- Costs include processing labor, non-labor processing, packaging, other ingredients (for butter and Cheddar cheese only), general and administrative, and return on investments.
- Since 1996, the Cheddar cheese cost studies have included costs associated with Cheddar cheese plants producing 500-pound barrels and 640-pound blocks. However, costs for packaging labor and packaging expenses were replaced with the average of those costs associated with 40-lb. block plants.

**Table 2b - CDFA Processing Costs
Imputed Annual Averages**

Year	Salted Butter (\$/lb.)	Nonfat Dry Milk (\$/lb.)
1982	\$0.0784	\$0.1498
1983	\$0.0777	\$0.1613
1984	\$0.0788	\$0.1555
1985	\$0.0782	\$0.1470
1986	\$0.0835	\$0.1366
1987	\$0.0864	\$0.1360
1988	\$0.0878	\$0.1373
1989	\$0.0863	\$0.1394
1990	\$0.0897	\$0.1494
1991	\$0.0915	\$0.1443
1992		\$0.1445
1993		\$0.1349
1994		\$0.1324
1995		\$0.1331
1996		\$0.1297
1997		\$0.1298
1998		\$0.1406
1999		\$0.1520
2000		\$0.1472
2001		\$0.1610
2002		\$0.1461
2003		\$0.1559

**Table 3 - History of Federal Manufacturing Cost Allowances
2000 to 2008**

	Butter (\$/lb)	NFDM (\$/lb)	Cheese (\$/lb)	Whey (\$/lb)
Jan 2000 through Dec 2000	\$0.1140	\$0.1370	\$0.1702	\$0.1370
Jan 2001 through Mar 2003	\$0.1150	\$0.1400	\$0.1650	\$0.1400
Apr 2003 through Jan 2007	↓	↓	↓	\$0.1590
Feb 2007 to date	\$0.1202	\$0.1570	\$0.1682	\$0.1956

- Prior to January 2000, federal orders did not use end product pricing.

**Table 4 – Minimum Possible Solids-Not-Fat Loss from Whey Stream
Based on Plants making no Dry Forms of Whey**

	Milk Receipts for California Cheese Plants May, June, July and August 2007				Minimum Possible Whey Loss	
	Number of Plants		Average Monthly Receipts (mil. lb.)		Plant Loss	61 Plant Whey Loss
Cheese plants processing whey	14	23%	1,436	89.5%	0%	10.5%
Cheese plants NOT processing whey	47	77%	169	10.5%	1%	11.4%
California Cheese Plants	61	100%	1,605	100.0%	2%	12.3%
					3%	13.2%
					4%	14.1%

**Table 5 – Fat and Solids-not-Fat Recovered in Dry Forms of Whey
California 2006**

Product	Pounds of				Assumed Tests			
	Fat	SNF	Water	Total	Fat	SNF	Water	Total
Delactose Permeate Whey	5,938,056	280,573,165	10,391,599	296,902,820	2.0%	94.5%	3.5%	100.0%
Dry Whey	1,285,439	111,833,227	3,739,460	116,858,126	1.1%	95.7%	3.2%	100.0%
Lactose Powder	confidentiality precludes displaying this data				0.0%	98.0%	2.0%	100.0%
Protein Concentrate - 34	↓	↓	↓	↓	2.1%	93.3%	4.6%	100.0%
Protein Concentrate - 80	↓	↓	↓	↓	7.2%	88.8%	4.0%	100.0%
TOTAL	14,431,614	756,909,602	24,995,979	796,337,195	1.8%	95.0%	3.1%	100.0%

Weighted Average Tests

Table 6a and 6b – Two Methods of Estimating SNF Recovery from the Whey Stream Using Pooling Data and Production data for 2006

	Table 6a - CDFA Formula	Table 6b - Van Slyke Formula
ASSUMPTIONS	<ul style="list-style-type: none"> • 8.8% SNF in vat • 5.8 lb/cwt dry whey yield 	<ul style="list-style-type: none"> • 8.8% SNF in vat • 34.5% protein as percent of SNF • 78% casein as percent of protein • 0.1% casein lost to whey • 1.09 recovery factor for non casein SNF in cheese moisture • 10.2 yield of Cheddar cheese from 3.65%, 8.8% milk • 38% cheese moisture
SNF TO WHEY STREAM CALCULATIONS	<p style="text-align: right;">5.80 dry whey yield 95.7% snf in dry whey 5.55 snf yield in dry whey 8.80 snf in vat 63.08% snf to whey</p>	<p style="text-align: right;">8.80 snf in vat 34.5% protein in SNF 3.03 protein in vat 78% casein in protein 2.37 casein in vat 0.10 casein lost to whey 2.27 casein in cheese</p> <p style="text-align: right;">10.20 yield of Cheddar cheese 38% cheese moisture 6.32 yield of solids in cheese 1.09 factor for non casein SNF in cheese moisture 0.52 non casein SNF in cheese</p> <p style="text-align: right;">2.27 casein in cheese 0.52 non casein SNF in cheese 2.79 total snf in cheese 8.80 total snf in vat 6.01 total snf in whey stream 68.31% snf to whey</p>
RECOVERY CALCULATIONS	<p>1,622,573,776 total Class 4b snf receipts in 2006 63.08% snf to whey 1,023,438,409 total snf in whey stream 756,909,602 total snf recovered as dry forms of whey in 2006 266,528,808 total snf not recovered</p> <p style="text-align: center;">26.04% percent snf not recovered</p>	<p>1,622,573,776 total Class 4b snf receipts in 2006 68.31% snf to whey 1,108,317,145 total snf in whey stream 756,909,602 total snf recovered as dry forms of whey in 2006 351,407,543 total snf not recovered</p> <p style="text-align: center;">31.71% percent snf not recovered</p>

Appendix I

Federal Milk Order Price Information Price Formulas – January to December 2000

Note: Milk prices are per 100 pounds or cwt., rounded to the nearest cent. Component prices are per pound, rounded to nearest one-hundredth cent. Cheese, dry whey, butter, and nonfat dry milk prices are weighted averages of weekly NASS survey prices.

Class I:

- Class I Price = (Class I skim milk price x 0.965) + (Class I butterfat price x 3.5).
- Class I Skim Milk Price = Higher of advanced Class III or IV skim milk pricing factors + applicable Class I differential.
- Class I Butterfat Price = Advanced butterfat pricing factor + (applicable Class I differential divided by 100).

Note: Advanced pricing factors are computed using applicable price formulas listed below, except that product price averages are for two weeks.

Class II:

- Class II Price = (Class II skim milk price x 0.965) + (Class II butterfat price x 3.5).
- Class II Skim Milk Price = Advanced Class IV skim milk pricing factor + \$0.70.
- Class II Butterfat Price = Butterfat price + \$0.007.
- Class II Nonfat Solids Price = Class II skim milk price divided by 9.

Class III:

- Class III Price = (Class III skim milk price x 0.965) + (Butterfat price x 3.5).
- Class III Skim Milk Price = (Protein price x 3.1) + (Other solids price x 5.9).
- Protein Price = ((Cheese price - **0.1702**) x 1.405) + (((Cheese price - **0.1702**) x 1.582) - Butterfat price) x 1.28).
- Other Solids Price = (Dry whey price - **0.137**) divided by 0.968.
- Butterfat Price = (Butter price - **0.114**) divided by 0.82.

Class IV:

- Class IV Price = (Class IV skim milk price x 0.965) + (Butterfat price x 3.5).
- Class IV Skim Milk Price = Nonfat solids price x 9.
- Nonfat Solids Price = (Nonfat dry milk price - **0.137**) divided by 1.02.
- Butterfat Price = See Class III.

Producer Prices:

- Butterfat Price = See Class III.
- Protein Price = See Class III.
- Others solids Price = See Class III.

- Somatic Cell Adjustment Rate = Cheese price x 0.0005, rounded to fifth decimal place. Rate is per 1,000 somatic cell count.

Federal Milk Order Price Information Price Formulas – January 2001 to March 2003

Note: Milk prices are per 100 pounds or cwt., rounded to the nearest cent. Component prices are per pound, rounded to nearest one-hundredth cent. Cheese, dry whey, butter, and nonfat dry milk prices are weighted monthly averages of weekly NASS survey prices, rounded to the nearest one-hundredth cent.

Class I:

- Class I Price = (Class I skim milk price x 0.965) + (Class I butterfat price x 3.5).
- Class I Skim Milk Price = Higher of advanced Class III or IV skim milk pricing factors + applicable Class I differential.
- Class I Butterfat Price = Advanced butterfat pricing factor+ (applicable Class I differential divided by 100).

Note: Advanced pricing factors are computed using applicable price formulas listed below, except that product price averages are for two weeks.

Class II:

- Class II Price = (Class II skim milk price x 0.965) + (Class II butterfat price x 3.5).
- Class II Skim Milk Price = Advanced Class IV skim milk pricing factor + \$0.70.
- Class II Butterfat Price = Butterfat price + \$0.007.
- Class II Nonfat Solids Price = Class II skim milk price divided by 9.

Class III:

- Class III Price = (Class III skim milk price x 0.965) + (Butterfat price x 3.5).
- Class III Skim Milk Price = (Protein price x 3.1) + (Other solids price x 5.9).
- Protein Price = ((Cheese price – **0.165**) x 1.405 + (((Cheese price – **0.165**) x 1.582) - Butterfat price) x 1.28).
- Other Solids Price = (Dry whey price – **0.14**) divided by 0.968, snubbed at zero.
- Butterfat Price = (Butter price – **0.115**) divided by 0.82.

Class IV:

- Class IV Price = (Class IV skim milk price x 0.965) + (Butterfat price x 3.5).
- Class IV Skim Milk Price = Nonfat solids price x 9.
- Nonfat Solids Price = Nonfat dry milk price - **0.14**
- Butterfat Price = See Class III.

Somatic Cell Adjustment Rate = Cheese price x 0.0005, rounded to fifth decimal place. Rate is per 1,000 somatic cell count difference from 350,000.

Federal Milk Order Price Information Price Formulas – April 2003 to January 2007

Note: Milk prices are per 100 pounds or cwt., rounded to the nearest cent. Component prices are per pound, rounded to nearest one-hundredth cent. Cheese, dry whey, butter, and nonfat dry milk prices are weighted monthly averages of weekly NASS survey prices, rounded to the nearest one-hundredth cent.

Class I:

- Class I Price = (Class I skim milk price x 0.965) + (Class I butterfat price x 3.5).
- Class I Skim Milk Price = Higher of advanced Class III or IV skim milk pricing factors + applicable Class I differential.
- Class I Butterfat Price = Advanced butterfat pricing factor+ (applicable Class I differential divided by 100).

Note: Advanced pricing factors are computed using applicable price formulas listed below, except that product price averages are for two weeks.

Class II:

- Class II Price = (Class II skim milk price x 0.965) + (Class II butterfat price x 3.5).
- Class II Skim Milk Price = Advanced Class IV skim milk pricing factor + \$0.70.
- Class II Butterfat Price = Butterfat price + \$0.007.
- Class II Nonfat Solids Price = Class II skim milk price divided by 9.

Class III:

- Class III Price = (Class III skim milk price x 0.965) + (Butterfat price x 3.5).
- Class III Skim Milk Price = (Protein price x 3.1) + (Other solids price x 5.9).
- Protein Price = ((Cheese price – **0.165**) x 1.383) + (((Cheese price – **0.165**) x 1.572) - Butterfat price x 0.9) x 1.17).
- Other Solids Price = (Dry whey price – **0.159**) times 1.03.
- Butterfat Price = (Butter price – **0.115**) times 1.20.

Class IV:

- Class IV Price = (Class IV skim milk price x 0.965) + (Butterfat price x 3.5).
- Class IV Skim Milk Price = Nonfat solids price times 9.
- Nonfat Solids Price = (Nonfat dry milk price - **0.14**) times 0.99.
- Butterfat Price = See Class III.

Somatic Cell Adjustment Rate = Cheese price x 0.0005, rounded to fifth decimal place. Rate is per 1,000 somatic cell count difference from 350,000.

Federal Milk Order Price Information Price Formulas – February 2007 to now

Note: Milk prices are per 100 pounds or cwt., rounded to the nearest cent. Component prices are per pound, rounded to nearest one-hundredth cent. Cheese, dry whey, butter, and nonfat dry milk prices are weighted monthly averages of weekly NASS survey prices, rounded to the nearest one-hundredth cent.

Class I:

- Class I Price = (Class I skim milk price x 0.965) + (Class I butterfat price x 3.5).
- Class I Skim Milk Price = Higher of advanced Class III or IV skim milk pricing factors + applicable Class I differential.
- Class I Butterfat Price = Advanced butterfat pricing factor+ (applicable Class I differential divided by 100).

Note: Advanced pricing factors are computed using applicable price formulas listed below, except that product price averages are for two weeks.

Class II:

- Class II Price = (Class II skim milk price x 0.965) + (Class II butterfat price x 3.5).
- Class II Skim Milk Price = Advanced Class IV skim milk pricing factor + \$0.70.
- Class II Butterfat Price = Butterfat price + \$0.007.
- Class II Nonfat Solids Price = Class II skim milk price divided by 9.

Class III:

- Class III Price = (Class III skim milk price x 0.965) + (Butterfat price x 3.5).
- Class III Skim Milk Price = (Protein price x 3.1) + (Other solids price x 5.9).
- Protein Price = ((Cheese price – **0.1682**) x 1.383) + (((Cheese price – **0.1682**) x 1.572) - Butterfat price x 0.9) x 1.17).
- Other Solids Price = (Dry whey price – **0.1956**) times 1.03.
- Butterfat Price = (Butter price - **0.1202**) times 1.20.

Class IV:

- Class IV Price = (Class IV skim milk price x 0.965) + (Butterfat price x 3.5).
- Class IV Skim Milk Price = Nonfat solids price times 9.
- Nonfat Solids Price = (Nonfat dry milk price - **0.157**) times 0.99.
- Butterfat Price = See Class III.

Somatic Cell Adjustment Rate = Cheese price x 0.0005, rounded to fifth decimal place. Rate is per 1,000 somatic cell count difference from 350,000.