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### ANALYSIS OF COMPONENT LEVELS IN INDIVIDUAL HERD MILK AT THE FARM LEVEL

### PACIFIC NORTHWEST AND ARIZONA FEDERAL MILK MARKETING ORDERS

2012

Staff Paper 14-01

Lori Espe

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#### 2012

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Abstract

Component levels in producer milk pooled on the Pacific Northwest (FO 124) and Arizona (FO 131) Federal Milk Marketing Orders were analyzed for 2012 to determine average levels, regional and seasonal variation, and, when possible, the statistical relationship between components. Handlers regulated under the Pacific Northwest Order report butterfat, protein, and other solids. Handlers regulated under the Arizona Order report butterfat only. Producer milk pooled was also valued using Federal order minimum producer prices for the respective orders. For 2012, a monthly average total of 627 producers were pooled on the Pacific Northwest and Arizona Orders. During 2012, these producers delivered 11.2 billion pounds to the two markets. The milk shed of the two Federal orders includes Arizona, California, Idaho, Oregon, Texas, Utah, and Washington.

Major findings of this study include:

- 1. The 2012 average component levels for the Pacific Northwest Order were 3.81% butterfat, 3.17% true protein, and 5.74% other solids. The 2012 average butterfat level for the Arizona Order was 3.55%.
- 2. In both orders, butterfat levels decrease during the summer months and increase in the late fall and winter. In the Pacific Northwest Order, protein shows similar seasonality as butterfat.
- 3. Although the volume of producer milk, number of producers, and average milk production per producer varies greatly between geographic regions, there are relatively small differences in aggregate component levels between these geographic regions within the milk sheds of the two orders.
- 4. The Pacific Northwest Order's linear regression in 2012 for protein is PRO% = 1.487 + 0.431 \* BF%, with an R-squared of 0.656.
- 5. The Pacific Northwest Order's regressions for estimating other solids using butterfat have a very poor correlation, having an R-squared of 0.19. The monthly regressions show a negative relationship; other solids levels appear to be independent of butterfat levels.
- 6. Long term observations indicate a trend of increased butterfat and protein levels on the Pacific Northwest Order for the 2000-2012 time period. Other solids levels have remained steady. On the Arizona Order, the butterfat level has steadily decreased over the same time period.

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#### ANALYSIS OF COMPONENT LEVELS IN INDIVIDUAL HERD MILK AT THE FARM LEVEL

### PACIFIC NORTHWEST AND ARIZONA FEDERAL MILK MARKETING ORDERS

### 2012

Lori Espe<sup>1</sup>

### I. INTRODUCTION

This study examines milk component levels in milk pooled on the Pacific Northwest (FO 124) and Arizona (FO 131) Milk Marketing Orders during 2012. Long term trends are also shown for the 2000-2012 time period. The milk components for the Pacific Northwest Order include butterfat, protein, and other solids and butterfat only for the Arizona Order. Protein and other solids were not included in any analyses concerning the Arizona Order because they were not used as a basis for pricing milk in 2012, and handlers were not obligated under the order to report information on protein and other solids levels.

Component levels in producer milk pooled on the Pacific Northwest and Arizona Orders were analyzed to determine average component levels, regional and seasonal variation, and the statistical relationship between components. Producer milk pooled on each order in 2012 was valued using Federal order minimum producer prices for the respective orders.

For 2012, a monthly average total of 627 producers were pooled on the Pacific Northwest and Arizona Orders. During 2012, these producers delivered 11.2 billion pounds to the two markets.

True protein was used as a basis for pricing milk under the Pacific Northwest Order. Unlike crude protein, true protein does not include non-protein nitrogen. In general, crude protein test levels are about 0.19 percentage points higher than true protein test levels. In a like manner, other solids levels associated with true protein levels are about 0.19 percentage points higher than those associated with crude protein test levels.

During 2012, the Pacific Northwest Order milk shed was comprised of producers located in Washington, Oregon, California, Idaho, and Utah. The Arizona Order milk shed was comprised of producers located in Arizona, California, and Texas. The milk shed of the two orders includes various geographic and climatic regions. These regions range from very dry climates (Arizona, Texas, Central Washington, Southern Idaho, and Eastern Oregon) to very wet climates (western and coastal regions of Oregon and Washington). Geographically, the Cascade Mountain Range, Pacific Ocean, and Columbia River provide general geographic and climate demarcations that may impact how dairy operations are managed.

<sup>&</sup>lt;sup>1</sup> Lori Espe is a Marketing Specialist with the Market Administrator's Office, Bothell, Washington. Dan Nguyen of the Pacific Northwest (FO 124) and Arizona (FO 131) Orders' staff assisted Ms. Espe.

### II. DATA AND METHODOLOGY

The data included in this study comprises all producer milk pooled on the Pacific Northwest and Arizona Orders. The data was collected from producer payrolls submitted by handlers to the market administrator's office. Components available for the Pacific Northwest Order were butterfat, protein, and other solids (other solids is nonfat solids less protein). Protein and other solids were not included for the Arizona Order because they were not used as a basis for pricing milk in 2012, and handlers were not obligated under the order to report information on protein and other solids levels.

In April and June through November 2012, milk production that historically qualified to be pooled on the Pacific Northwest Order was not pooled due to price relationships. This historically eligible producer milk was **<u>not</u>** included in this analysis. The exclusion of milk not pooled was due to the unavailability of the information, and it almost always represented less than three handlers and was, therefore, restricted.

The Pacific Northwest and Arizona Orders were divided into seven regions. (See Map A-2.) The small number of producers in Northern California pooled on the Pacific Northwest Order made it necessary to combine them with another region (Western Oregon, Region 5). Small amounts of milk from producers in Utah were associated with the Pacific Northwest Order in 2012; those producers have been combined with Central/Eastern Oregon data (Region 6). For 2012, Northern Idaho data (Region 4) was combined with Central/Eastern Oregon data (Region 6) for reasons of confidentiality. Arizona, Southern California, and Texas producers were also combined for reasons of confidentiality. Other than the identified exceptions, order and/or state lines were considered as primary boundaries. The regions within states were defined based on climate conditions and geography.

The regions are as follows:

Western Washington	Region 1
Central Washington	Region 2
Eastern Washington	Region 3
Northern Idaho (Restricted for 2012)	Region 4
Western Oregon and Northern California	Region 5
Central/Eastern Oregon, Idaho, and Utah	Region 6
Arizona, Southern California, and Texas	Region 7

In Oregon and Washington, the west side of the Cascade Mountain Range has more precipitation and is characterized by a milder climate than the eastern side of the states.<sup>2</sup> The region east of the Cascade Mountain Range has a drier climate with warmer summers and colder winters. In Eastern Washington, the precipitation rate begins to increase slightly. Arizona is very dry year round with much less precipitation and has many days with average temperatures much higher than the other regions studied.

Ordinary Least Squares regression analysis was used to determine relationships between components.

<sup>&</sup>lt;sup>2</sup> Climate information based on Western Regional Climate Center precipitation maps.

### III. SEASONAL VARIATION IN MILK COMPONENT LEVELS

In 2012, producers associated with the Pacific Northwest Order delivered 6.68 billion pounds. For 2012, producer milk tested, on average, 3.81% butterfat, 3.17% protein, and 5.74% other solids.

In the Pacific Northwest Order, producer milk butterfat percentages decrease in the spring and increase in the fall and winter. Table 1 shows the monthly and annual average component levels for the Pacific Northwest Order. Milk production per cow typically is less, and animals are fed more stored feed in the fall and winter. In the spring, during the flush of milk production, the feeding of more fresh grass increases the total pounds produced but decreases the percentage of butterfat and protein content of milk. The spring flush is additionally impacted by the biological cycle of cows and the increase in temperature in the spring. Butterfat levels in the Pacific Northwest Order in 2012 were the highest in December at 4.01% and lowest in July at 3.67%.

The seasonal cycle of protein levels is similar to butterfat but with a lesser degree of variation. Protein levels in 2012 were highest in December at 3.29% and lowest in July at 3.05%. Other solids levels were much more consistent throughout the year when compared to the seasonal changes in butterfat and protein levels. Other solids levels reached a peak of 5.77% in July, a low of 5.71% in October and November, and showed very little seasonality.

Table 1								
Monthly Component Levels								
Pacific Northwest Order								
	2	2012						
Month	Butterfat	Protein	Other Solids					
	- percent -	- percent -	- percent -					
January	3.90	3.24	5.73					
February	3.84	3.20	5.74					
March 3.83 3.20 5.73								
April	April 3.78 3.15 5.75							
May	May 3.70 3.13 5.75							
June	3.70	3.09	5.73					
July	3.67	3.05	5.77					
August	3.68	3.06	5.75					
September	3.76	3.14	5.72					
October	3.87	3.23	5.71					
November 3.91 3.23 5.71			5.71					
December 4.01 3.29			5.72					
Weighted Average	Weighted Average 3.81 3.17 5.74							

In 2012, producers associated with the Arizona Order delivered 4.56 billion pounds. For 2012, producer milk tested, on average, 3.55% butterfat. Butterfat levels in the Arizona Order follow a similar seasonal pattern as the Pacific Northwest Order. The butterfat levels decrease in the

spring and rise again in the fall. (See Table 2.) Butterfat levels in the Arizona Order in 2012 were highest in November and December at 3.64% and lowest in April and May at 3.48%.

Table 2							
Monthly Component Levels							
Arizona Order							
	2012						
Month	Butterfat						
	- percent -						
January	3.60						
February	3.53						
March	3.52						
April	3.48						
May	3.48						
June	3.50						
July	3.51						
August	3.54						
September	3.55						
October	3.60						
November	3.64						
December	3.64						
Weighted Average	3.55						

For 2012, the monthly and annual weighted average butterfat levels were less than the mean averages for both orders. The same is mostly true for the Pacific Northwest Order's protein levels, except in the winter months when the weighted average protein levels were the same or marginally higher than the mean average. (See Tables 3 and 4 and Appendix Tables A-1 and A-2.) This difference in relative levels of the weighted average and the mean would indicate that individual producers who deliver smaller amounts of milk (on a monthly basis) have higher levels of these components in their milk than their larger counterparts. Conversely, on the Pacific Northwest Order, the other solids weighted average is higher than the mean, indicating that producers who deliver larger amounts of milk have higher levels of other solids in their milk than their smaller counterparts.

During 2012, for the Pacific Northwest Order, producers' individual monthly average butterfat tests ranged from 2.78% to 6.20%; protein tests ranged from 2.47% to 4.31%, and other solids levels ranged from 4.62% to 5.95%. (See Table 3.) Most monthly average component tests are within one standard deviation of the mean.<sup>3</sup> Based on the definition of a standard deviation, most producers had butterfat tests ranging from 3.54% to 4.38%. Similarly, most protein tests ranged from 2.97% to 3.41%, and most other solids tests ranged from 5.62% to 5.80%. (See Appendix Table A-1 for monthly component statistics.)

<sup>&</sup>lt;sup>3</sup> By definition, for a *normal distribution*, approximately 68% of observations are within one standard deviation of the mean.

In 2012, Arizona Order producers' butterfat tests ranged from 2.98% to 5.46%. (See Table 4.) Based on the definition of a standard deviation, most producers had butterfat tests ranging from 3.30% to 3.96%. (See Appendix Table A-2 for monthly component statistics.)

Table 3 Component Levels: Weighted Average, Mean, Median, Standard Deviation, Minimum, and Maximum Pacific Northwest Order 2012									
	Butterfat Protein Other Solids								
	%	%	%						
Weighted Average	3.81	3.17	5.74						
Mean	3.96	3.19	5.71						
Median	Median 3.87 3.15 5.72								
Standard Deviation	0.42	0.22	0.09						
Minimum	Minimum 2.78 2.47 4.62								
Maximum	6.20	4.31	5.95						

Table 4 Component Levels: Weighted Average, Mean, Median, Standard Deviation, Minimum, and Maximum Arizona Order 2012					
Butterfat					
	%				
Weighted Average	3.55				
Mean	3.63				
Median	3.55				
Standard Deviation	0.33				
Minimum	2.98				
Maximum	5.46				

### IV. REGIONAL VARIATION IN MILK COMPONENT LEVELS

The data was divided into seven regions based on the geographic location of the dairy farms. The seven regions are primarily based on a combination of relatively homogeneous climates and state and Federal order borders.

Regions 1 through 6 are associated with the Pacific Northwest region and are defined in Appendix Map A-2. Region 7 represents the Arizona Order. In 2012, the region with the most milk associated with the Pacific Northwest Order was Region 2 followed by Regions 1, 5, 3 & the combined Regions 4, and 6. Data for Region 4 was restricted in some months in 2012, and was combined with Region 6 data. Component levels for Regions 1-3 appear to vary only slightly. Table 5 provides 2012 milk production, average number of producers, and component tests for each region.

In general, comparing all the regions, Region 7 had the most milk pooled in 2012, with 4.56 billion pounds, while Region 1 had the most producers (267 producers on average). Average milk production per producer was the highest in Region 7 with an average of 48.0 million pounds per producer for the year. The highest butterfat levels in 2012 were in Region 6 with annual tests of 4.08%, while Region 7 had the lowest annual butterfat test of 3.55%. Protein levels in Region 6 (3.44%) and other solids levels in Region 5 (5.76%) were the highest for each of those components.

Producer milk, number of producers, and average milk production per producer varied greatly between regions. Some comparatively small differences in component levels were also evident. In 2012, butterfat levels in Regions 5 and 6 were noticeably higher than the other regions, while Region 7 was much lower than the other regions. Protein levels in Region 6 were 0.30% higher than Region 1. Other solids levels by region varied only 0.04% between the high and low for the year 2012; ranging from 5.72% in Region 1 to 5.76% in Region 5.

On the Pacific Northwest Order, changes in producer numbers and milk marketed between March 2011 and March 2012 followed the national trend of increased milk production by fewer producers. The month of March was used for the comparison since both months did not have eligible milk not pooled. Although March is a representative month, this comparison shows effects of handlers' decisions and changes in Federal Order regulations between 2011 and 2012.

The Arizona Order's producer milk marketed was also higher in March 2012 when compared to previous year levels, with a slight decrease in producer numbers. Table 6 provides a brief comparison of producer numbers and milk marketed for March 2011 and 2012.

	Table 5						
Va	rious Statistics l	by Region For 2012					
Region 1 (Western Was	hington)	<b>Region 2 (Central Washington)</b>					
Milk Production	2,094,809,383	Milk Production	2,536,797,682				
Average Number of Producers	267	Average Number of Producers	77				
Average Pounds Per Producer	7,845,728	Average Pounds Per Producer	32,945,424				
Butterfat Test	3.83%	Butterfat Test	3.72%				
Protein Test	3.14%	Protein Test	3.14%				
Other Solids Test	5.72%	Other Solids Test					
Region 3 (Eastern Washingt	on, Northern	Region 4 (Northern Idaho) *C	Combined with				
Idaho)		Region 6 for 2012 due to co	nfidentiality				
Milk Production	519,274,075	Milk Production	R				
Average Number of Producers	31	Average Number of Producers	R				
Average Pounds Per Producer	16,750,777	Average Pounds Per Producer	R				
Butterfat Test	3.75%	Butterfat Test	R				
Protein Test 3.19% Protein		Protein Test	R				
Other Solids Test	5.74%	Other Solids Test	R				
		Region 6 (Central/Easter	n Oregon,				
Region 5 (Western Oregon	n, Northern	Southern Idaho, U	tah)				
California)		(& Northern Idaho in	2012)				
Milk Production	1,106,844,742	Milk Production	419,231,723				
Average Number of Producers	140	Average Number of Producers	17				
Average Pounds Per Producer	7,906,034	Average Pounds Per Producer	24,660,690				
Butterfat Test	3.90%	Butterfat Test	4.08%				
Protein Test	3.20%	Protein Test	3.44%				
Other Solids Test	5.76%	Other Solids Test	5.73%				
Region 7 (Arizona, Souther	n California,						
Texas)							
Milk Production	4,555,678,466						
Average Number of Producers	95						
Average Pounds Per Producer	47,954,510						
Butterfat Test	3.55%						
Protein Test	n/a						
O(1 + 0) O(1 + 1) T = 1	<b>m</b> /a						

n/a = not applicableR = Restricted

Table 6           Producer Milk and Producers by Region for March 2011 and 2012							
		Producer Milk			Producers		
	March	March		March	March		
	2011	2012	Change	2011	2012	Change	
Region 1	180,531,583	183,324,285	2,792,702	275	271	-4	
Region 2	264,853,106	278,549,294	13,696,188	102	102	0	
Region 3	56,904,375	62,131,160	5,226,781	35	35	0	
Region 4	R	R	R	R	R	R	
Region 5	117,543,262	120,658,089	3,114,827	198	196	-2	
Region 6*	71,118,284	74,164,695	3,046,411	20	22	2	
Region 7	413,105,152	434,655,999	21,550,847	98	94	-4	
Total	1,104,055,766	1,153,483,522	49,427,756	728	720	-8	

\*R= Restricted. Data for Region 4 combined with Region 6.

### V. STATISTICAL RELATIONSHIP AMONG MILK COMPONENTS

Regression analysis was used to analyze the linear relationship between milk component levels. The analysis revealed that the only significant relationship between components was between butterfat (BF) and protein (PRO). Regressions of nonfat solids and protein and nonfat solids and butterfat were found to be insignificant and not included in this study. This latter finding was expected and is due to: (1) the nonfat solids level is, by definition, protein plus other solids; and (2) other solids levels appear random and show little seasonal variation. (See Appendix Tables A-4 and A-5 and Figures A-5 and A-6.)

The Pacific Northwest Order had 6,381 observations in 2012. Appendix Figures A-5 and A-6 show graphical representations of the linear regressions for May and November 2012.

The butterfat and protein regression equations for the Pacific Northwest Order were calculated for 2000 through 2012. (See Table 7.) Over the 2000 - 2009 periods, the general trend of the regression is toward a lower intercept but a steeper slope, suggesting that, in general, for those years a change in the butterfat level is associated with a larger change in the protein level. The data for 2010 and 2011, though, indicates a higher intercept with a slope similar to ten years ago. The reversed trend is likely due to handler pooling patterns that were different in 2010 and 2011 than previous years. For 2012, the regression equation resumed the general trend observed during the 2000-2009 time period.

Table 7 Pacific Northwest Order Comparison of Regression Results: Butterfat Level as a Predictor of Protein Levels 2000 through 2012					
Year	Equation	Correlation			
2000	TRUE PRO% = 1.526 + 0.414 BF%	$R^2 = 0.600$			
2001	TRUE PRO% = 1.535 + 0.417 BF%	$R^2 = 0.599$			
2002	TRUE PRO% = 1.488 + 0.426 BF%	$R^2 = 0.649$			
2003	TRUE PRO% = 1.452 + 0.432 BF%	$R^2 = 0.661$			
2004	TRUE PRO% = 1.434 + 0.439 BF%	$R^2 = 0.652$			
2005	TRUE PRO% = 1.438 + 0.438 BF%	$R^2 = 0.663$			
2006	TRUE PRO% = 1.418 + 0.444 BF%	$R^2 = 0.626$			
2007	TRUE PRO% = 1.424 + 0.447 BF%	$R^2 = 0.679$			
2008	TRUE PRO% = 1.488 + 0.430 BF%	$R^2 = 0.660$			
2009	TRUE PRO% = 1.486 + 0.431 BF%	$R^2 = 0.657$			
2010	TRUE PRO% = 1.546 + 0.419 BF%	$R^2 = 0.678$			
2011	TRUE PRO% = 1.556 + 0.414 BF%	$R^2 = 0.652$			
2012	TRUE PRO% = 1.487 + 0.431 BF%	$R^2 = 0.656$			

### VI. MINIMUM ORDER VALUE OF MILK PRODUCTION

The use of monthly component prices allows for the evaluation of the minimum order value of milk components in a hundredweight of milk.

The minimum order value at test of producer milk pooled on the Pacific Northwest Order in 2012 averaged \$18.19 per hundredweight. The weighted average value of each component comprising the \$18.19 per hundredweight was: \$6.45 for butterfat; \$9.47 for protein; \$2.36 for other solids; and a producer price differential of negative \$0.09.<sup>4</sup>

The value of producers' milk at test pooled on the Arizona Order in 2012 averaged \$17.59 per hundredweight. The weighted average value of skim and butterfat portions of the \$17.59 per hundredweight was: \$6.08 for butterfat; and \$11.51 for skim.<sup>5</sup>

There is an apparent inverse relationship between the size-range of producers' production and the butterfat and protein levels in their milk. An inverse relationship between size-range and certain component levels may be due to the relative prevalence of high component testing breeds among smaller herd sizes (e.g. Jerseys) compared to lower component testing breeds (e.g. Holsteins). Another possible reason for this inverse relationship is that smaller herds may be fed differently than larger herds. The weighted average component levels by size-range of milk production are summarized in Appendix Table A-7 and Figure A-7. The inverse relationship between size-range and producer butterfat and protein levels is more apparent on the Pacific Northwest Order than in the levels of butterfat on the Arizona Order. On the Pacific Northwest Order, there appears to be a positive relationship between the size-range of a producer's production and the other solids levels in their milk. The difference in component levels, in turn, translates to an inverse relationship between size-range and minimum order value per hundredweight.

The aggregated value of milk production by size-range of milk production is summarized in Appendix Table A-8 and Figure A-8. For the Pacific Northwest Order, on average, using 2012 Federal order prices, producers in the 50,000 to 100,000 pounds range of production were valued more per hundredweight, \$19.17, than other producers. Producers with 4-6 million pounds of production averaged the lowest amount per hundredweight, at \$17.75. This relationship, as earlier mentioned, is generally indicative of the fact that smaller herds typically have higher component levels than larger herds. On the Arizona Order, using skim-butterfat values, a relationship between size-range and value per hundredweight has historically been less evident. However, for 2012 a relationship between size-range and value per hundredweight was apparent. Producers in the 300,000 to 400,000 pounds range had the highest weighted average value at \$19.62 per hundredweight. Conversely, large farms in the 6-7 million pounds range and over 7 million pounds range had the lowest weighted average value, at \$17.19 and \$17.33 per hundredweight, respectively.

<sup>&</sup>lt;sup>4</sup> The producer price differentials for the Pacific Northwest Order are subject to applicable location adjustments. The effects of location adjustments are not dealt with in this study.

<sup>&</sup>lt;sup>5</sup> The producer prices for the Arizona Order are subject to applicable location adjustments. The effects of location adjustments are not dealt with in this study.

#### VII. LONG TERM TRENDS

While month-by-month comparisons show the seasonal cycles of component levels, year-by-year comparisons demonstrate the long term trends of component levels. Appendix Tables A-9 and A-10 show selected statistical data for 2000-2012.

For butterfat on the Pacific Northwest Order, the levels have, in general shown an increase over the 2000-2012 period. The annual average increased 0.16 percentage points, from 3.65 percent in 2000 to 3.81 percent in 2012. In contrast, the butterfat levels on the Arizona Order have shown a steady decline from 3.62 percent in 2000 to an annual average of 3.55 percent in 2012. For the Arizona Order overall, the annual average was highest in 2002 at 3.63 percent and lowest in 2009 at 3.49 percent, a difference of 0.14 percentage points.

Protein levels on the Pacific Northwest Order have shown steady year-to-year increases over the 2000-2012 period. Current levels have exceeded 3.2 percent in the late fall months, with an annual average of 3.17 percent in 2012. In 2000, there were some summer months where the monthly average fell below 3.0 percent resulting in an annual average of 3.02 percent. Overall, the annual average protein test increased 0.15 percentage points between 2000 and 2012.

Other solids levels have remained fairly steady over the 2000-2012 time period, ranging from 5.69 to 5.74 percent.

### VIII. SUMMARY

This paper analyzes milk components associated with the Pacific Northwest and Arizona Orders. Handlers regulated under the Pacific Northwest Order report butterfat, protein, and other solids. Handlers regulated under the Arizona Order report butterfat, only. For each order, producer information was collected from handler payrolls submitted to the market administrator's office. Component levels were examined using a variety of measures including: annual averages, seasonal and regional averages, relationships between components, frequency distributions and scatter plots of regressions, and the value of milk components by size-range of production.

Weighted average component levels for the Pacific Northwest Order in 2012 were: 3.81% butterfat, 3.17% protein, and 5.74% other solids. Butterfat percentages peaked in December and reached a low in July. Protein percentages also peaked in December and reached a low in July. Other solids demonstrated very little seasonal change.

Although the volume of producer milk, number of producers, and average milk production per producer varies greatly between regions, differences in aggregate component levels between geographic regions within the milk sheds of the two orders are comparatively small.

The linear relationship between butterfat and protein on the Pacific Northwest Order was:

Protein = 1.487 + 0.431 \* Butterfat (R<sup>2</sup> = 0.656)

In 2012, the Pacific Northwest Order's weighted average price received for milk was \$18.19 per hundredweight, at test.

The annual average butterfat level for the Arizona Order in 2012 was 3.55%. Butterfat levels peaked in November and December, reaching a low in April and May. In 2012, the Federal order weighted average price received for milk was \$17.59 per hundredweight, at test.

In general, for the Pacific Northwest Order, as producers' monthly deliveries increase, the weighted average value of the milk, at Federal order prices, decreases. The same is more apparent on the Arizona Order in 2012 than in previous years.

Long term observations indicate a trend of increased butterfat and protein levels on the Pacific Northwest Order for the 2000-2012 time period. Other solids levels have remained steady. On the Arizona Order, the butterfat level has steadily decreased over the same time period.

# APPENDIX

# STATISTICAL DATA FOR PRODUCERS ON THE PACIFIC NORTHWEST ORDER INCLUDED IN COMPONENT ANALYSIS

### 2012

# Butterfat

	Weighted		Standard				Number of
<u>Month</u>	<u>Average</u>	<u>Mean</u>	<b>Deviation</b>	<u>Median</u>	<u>Minimum</u>	<u>Maximum</u>	<b>Observations</b>
	- % -	- % -	- % -	- % -	- % -	- % -	
January	3.90	4.06	0.44	3.94	3.06	6.20	626
February	3.84	3.99	0.41	3.88	2.99	5.44	624
March	3.83	4.00	0.42	3.89	2.84	5.51	626
April	3.78	3.95	0.40	3.85	2.94	5.43	605
May	3.70	3.84	0.39	3.74	2.78	5.09	616
June	3.70	3.82	0.35	3.73	3.15	5.19	445
July	3.67	3.80	0.35	3.72	2.91	5.20	442
August	3.68	3.81	0.35	3.74	3.05	5.24	439
September	3.76	3.93	0.39	3.83	3.16	5.46	451
October	3.87	4.05	0.42	3.93	3.25	5.66	450
November	3.91	4.09	0.43	3.96	2.90	5.72	450
December	4.01	4.15	0.45	4.01	3.18	6.10	607
For the Year	3.81	3.96	0.42	3.87	2.78	6.20	6,381

#### Protein

	Weighted		Standard				Number of
<u>Month</u>	<u>Average</u>	<u>Mean</u>	<b>Deviation</b>	<u>Median</u>	<u>Minimum</u>	<u>Maximum</u>	<b>Observations</b>
	- % -	- % -	- % -	- % -	- % -	- % -	
January	3.24	3.23	0.24	3.17	2.47	4.31	626
February	3.20	3.19	0.22	3.15	2.68	4.06	624
March	3.20	3.21	0.22	3.16	2.70	4.06	626
April	3.15	3.18	0.20	3.13	2.64	3.86	605
May	3.13	3.16	0.21	3.10	2.63	3.89	616
June	3.09	3.12	0.19	3.08	2.74	3.95	445
July	3.05	3.10	0.20	3.06	2.72	3.96	442
August	3.06	3.09	0.19	3.05	2.76	3.97	439
September	3.14	3.17	0.20	3.13	2.78	4.10	451
October	3.23	3.27	0.22	3.23	2.85	4.15	450
November	3.23	3.26	0.23	3.21	2.79	4.02	450
December	3.29	3.29	0.24	3.22	2.76	4.28	607
For the Year	3.17	3.19	0.22	3.15	2.47	4.31	6,381

# STATISTICAL DATA FOR PRODUCERS ON THE PACIFIC NORTHWEST ORDER INCLUDED IN COMPONENT ANALYSIS

# 2012

# **Other Solids**

	Weighted		Standard				Number of
<u>Month</u>	Average	<u>Mean</u>	<b>Deviation</b>	<u>Median</u>	<u>Minimum</u>	<u>Maximum</u>	<b>Observations</b>
	- % -	- % -	- % -	- % -	- % -	- % -	
January	5.73	5.71	0.10	5.73	4.62	5.93	626
February	5.74	5.72	0.08	5.73	5.34	5.95	624
March	5.73	5.71	0.08	5.73	5.38	5.91	626
April	5.75	5.73	0.07	5.74	5.42	5.91	605
May	5.75	5.73	0.07	5.73	5.35	5.91	616
June	5.73	5.70	0.07	5.72	5.34	5.86	445
July	5.77	5.73	0.08	5.75	5.37	5.89	442
August	5.75	5.72	0.08	5.73	5.37	5.88	439
September	5.72	5.68	0.09	5.70	5.22	5.85	451
October	5.71	5.67	0.10	5.69	5.15	5.86	450
November	5.71	5.67	0.09	5.70	5.17	5.85	450
December	5.72	5.69	0.09	5.71	5.14	5.87	607
For the Year	5.74	5.71	0.09	5.72	4.62	5.95	6,381

# STATISTICAL DATA FOR PRODUCERS ON THE ARIZONA ORDER INCLUDED IN COMPONENT ANALYSIS

### 2012

# Butterfat

	Weighted		Standard				Number of
<u>Month</u>	<u>Average</u>	<u>Mean</u>	<b>Deviation</b>	<u>Median</u>	<u>Minimum</u>	<u>Maximum</u>	<b>Observations</b>
	- % -	- % -	- % -	- % -	- % -	- % -	
January	3.60	3.70	0.38	3.62	3.07	5.43	99
February	3.53	3.62	0.32	3.54	2.98	4.71	97
March	3.52	3.58	0.30	3.52	3.16	4.64	94
April	3.48	3.55	0.30	3.49	3.16	4.54	94
Мау	3.48	3.55	0.29	3.49	3.17	4.52	94
June	3.50	3.55	0.28	3.48	3.11	4.61	94
July	3.51	3.58	0.28	3.52	3.18	4.61	94
August	3.54	3.61	0.30	3.54	3.14	4.82	95
September	3.55	3.61	0.31	3.54	3.02	4.77	95
October	3.60	3.69	0.34	3.61	3.05	5.01	98
November	3.64	3.75	0.39	3.66	3.11	5.46	96
December	3.64	3.73	0.35	3.67	3.18	4.91	94
For the Year	3.55	3.63	0.33	3.55	2.98	5.46	1,144

# WEIGHTED AVERAGE COMPONENT LEVELS BY REGION

# 2012

# Butterfat

	Region 1	<u>No.*</u>	Region 2	<u>No.*</u>	<u>Region 3**</u>	<u>No.*</u>	Region 4	<u>No.*</u>
	-% -		-% -		-% -		-% -	
January	3.86	272	3.81	103	3.84	38	R	R
February	3.81	271	3.75	102	3.73	38	R	R
March	3.83	271	3.73	102	3.68	38	R	R
April	3.82	270	3.69	99	3.62	38	R	R
Мау	3.73	270	3.59	100	3.50	39	R	R
June	3.77	268	3.61	55	3.74	29	R	R
July	3.75	266	3.57	53	3.71	29	R	R
August	3.76	264	3.57	53	3.71	29	R	R
September	3.83	262	3.67	56	3.85	29	R	R
October	3.91	262	3.80	53	3.99	29	R	R
November	3.96	261	3.85	54	4.06	29	R	R
December	3.97	261	3.94	97	3.96	37	R	R
For the Year	3.83	267	3.73	77	3.75	34	R	R
	Region 5	<u>No.*</u>	Region 6	<u>No.*</u>	Region 7	<u>No.*</u>		
	-% -		-% -		-% -			
January	4.01	196	4.17	17	3.60	99		
February	3.98	196	4.13	17	3.53	97		
March	4.01	196	4.06	19	3.52	94		
April	3.98	186	3.94	12	3.48	94		
Мау	3.90	187	3.94	20	3.48	94		
June	3.68	81	3.74	12	3.50	94		
July	3.65	82	3.67	12	3.51	94		
August	3.67	82	3.70	11	3.54	95		
September	3.77	93	3.85	11	3.55	95		
October	3.85	94	4.04	12	3.60	98		
November	3.87	94	4.06	12	3.64	96		
December	4.07	193	4.30	19	3.64	94		
For the Year	3.90	140	4.08	15	3.55	95		

# Table A-3 (Continued)

# WEIGHTED AVERAGE COMPONENT LEVELS BY REGION

# 2012

			Pro	otein				
	Region 1	<u>No.*</u>	Region 2	<u>No.*</u>	Region 3**	<u>No.*</u>	Region 4	<u>No.*</u>
	-% -		-% -		-% -		-% -	
January	3.16	272	3.21	103	3.21	38	R	R
February	3.13	271	3.17	102	3.19	38	R	R
March	3.15	271	3.16	102	3.20	38	R	R
April	3.13	270	3.12	99	3.16	38	R	R
Мау	3.08	270	3.07	100	3.09	39	R	R
June	3.10	268	3.05	55	3.14	29	R	R
July	3.08	266	2.99	53	3.08	29	R	R
August	3.07	264	3.01	53	3.10	29	R	R
September	3.14	262	3.11	56	3.22	29	R	R
October	3.22	262	3.22	53	3.34	29	R	R
November	3.21	261	3.22	54	3.36	29	R	R
December	3.21	261	3.27	97	3.27	37	R	R
For the Year	3.14	267	3.14	77	3.19	34	R	R
	Region 5	<u>No.*</u>	Region 6	<u>No.*</u>	Region 7	<u>No.*</u>		
	-% -		-% -		-% -			
January	3.25	196	3.50	17	N/A	N/A		
February	3.21	196	3.44	17	N/A	N/A		
March	3.24	196	3.46	19	N/A	N/A		
April	3.21	186	3.28	12	N/A	N/A		
Мау	3.20	187	3.38	20	N/A	N/A		
June	3.10	81	3.20	12	N/A	N/A		
July	3.08	82	3.19	12	N/A	N/A		
August	3.09	82	3.22	11	N/A	N/A		
September	3.16	93	3.32	11	N/A	N/A		
October	3.22	94	3.39	12	N/A	N/A		
November	3.21	94	3.38	12	N/A	N/A		
December	3.28	193	3.59	19	N/A	N/A		
For the Year	3.20	140	3.45	15	N/A	N/A		

### Table A-3 (Continued)

#### WEIGHTED AVERAGE COMPONENT LEVELS BY REGION

#### 2012

#### **Other Solids**

	Region 1	<u>No.*</u>	Region 2	<u>No.*</u>	Region 3**	<u>No.*</u>	Region 4	<u>No.*</u>
	-% -		-% -		-% -		-% -	
January	5.72	272	5.73	103	5.74	38	R	R
February	5.74	271	5.75	102	5.76	38	R	R
March	5.72	271	5.73	102	5.74	38	R	R
April	5.73	270	5.75	99	5.76	38	R	R
Мау	5.72	270	5.75	100	5.75	39	R	R
June	5.71	268	5.74	55	5.73	29	R	R
July	5.75	266	5.78	53	5.78	29	R	R
August	5.73	264	5.77	53	5.76	29	R	R
September	5.70	262	5.73	56	5.71	29	R	R
October	5.69	262	5.72	53	5.69	29	R	R
November	5.70	261	5.71	54	5.69	29	R	R
December	5.71	261	5.71	97	5.73	37	R	R
For the Year	5.72	267	5.74	77	5.74	34	R	R
	Region 5	<u>No.*</u>	Region 6	<u>No.*</u>	Region 7	<u>No.*</u>		
	-% -		-% -		-% -			
January	5.75	196	5.71	17	N/A	N/A		
February	5.75	196	5.70	17	N/A	N/A		
March	5.75	196	5.72	19	N/A	N/A		
April	5.78	186	5.76	12	N/A	N/A		
Мау	5.77	187	5.77	20	N/A	N/A		
June	5.75	81	5.76	12	N/A	N/A		
July	5.78	82	5.79	12	N/A	N/A		
August	5.78	82	5.77	11	N/A	N/A		
September	5.74	93	5.73	11	N/A	N/A		
October	5.74	94	5.72	12	N/A	N/A		
November	5.73	94	5.71	12	N/A	N/A		
December	5.74	193	5.70	19	N/A	N/A		
For the Year	5.76	140	5.73	15	N/A	N/A		

\* Number of producers included in monthly average component level.

\*\* Data for Region 4 was restricted and included with Region 3 for the full year.

R = Restricted. Data for Region 4 represented fewer than three producers June-December. For consistency, Region 4 was included with Region 3 for the full year.

N/A = not applicable, Arizona Order, Area 7, did not use protein and other solids.

# LINEAR RELATIONSHIPS BETWEEN VARIOUS MILK COMPONENTS

### 2012

# Butterfat Levels as a Predictor of Protein Protein = c + b (Butterfat)

# Pacific Northwest Order

	С	b				
		Butterfat	Standard	R-Squared	Standard	Number of
	Constant	<u>Coefficient</u>	Error of b	(Adjusted)	Error	<u>Comparisons</u>
January	1.51595	0.42386	0.01306	0.62740	0.14459	626
February	1.53405	0.41651	0.01396	0.58816	0.14265	624
March	1.61626	0.39814	0.01329	0.58922	0.13835	626
April	1.60350	0.39945	0.01276	0.61851	0.12412	605
May	1.48209	0.43585	0.01288	0.65035	0.12388	616
June	1.43601	0.44162	0.01574	0.63915	0.11544	445
July	1.32425	0.46773	0.01474	0.69520	0.10833	442
August	1.40860	0.44202	0.01536	0.65371	0.11388	439
September	1.49933	0.42674	0.01428	0.66455	0.11672	451
October	1.56592	0.42173	0.01409	0.66602	0.12525	450
November	1.58429	0.41035	0.01509	0.62178	0.13879	450
December	1.47303	0.43652	0.01238	0.67199	0.13608	607
For the Year	1.48736	0.43061	0.00390	0.65629	0.13038	6,381

# LINEAR RELATIONSHIPS BETWEEN VARIOUS MILK COMPONENTS

### 2012

# Butterfat Levels as a Predictor of Other Solids Other Solids = c + b (Butterfat)

# Pacific Northwest Order

	С	b Butterfat	Standard	R-Squared	Standard	Number of
	Constant	<b>Coefficient</b>	Error of b	(Adjusted)	Error	<u>Comparisons</u>
January	6.06273	-0.08802	0.00799	0.16145	0.08847	626
February	6.02288	-0.07572	0.00745	0.14102	0.07616	624
March	5.93543	-0.05560	0.00718	0.08612	0.07479	626
April	5.92860	-0.04951	0.00735	0.06845	0.07149	605
May	5.86902	-0.03696	0.00737	0.03780	0.07085	616
June	6.12068	-0.10979	0.00845	0.27451	0.06195	445
July	6.14094	-0.10786	0.00933	0.23132	0.06855	442
August	6.12920	-0.10794	0.00965	0.22093	0.07151	439
September	6.13752	-0.11710	0.00948	0.25185	0.07748	451
October	6.19032	-0.12885	0.00881	0.32146	0.07837	450
November	6.20278	-0.13005	0.00825	0.35509	0.07591	450
December	6.10322	-0.09938	0.00720	0.23839	0.07908	607
For the Year	6.06120	-0.08951	0.00234	0.18678	0.07812	6,381

#### MONTHLY PRODUCER COMPONENT PRICES

### 2012

### **Pacific Northwest Order**

<u>Month</u>	Butterfat <u>Price</u>	Protein <u>Price</u>	Other Solids Price	Producer Price Differential 1/
	\$ / pound	\$/pound	\$7 pound	\$ / hundredweight
January	1.7178	2.7326	0.5032	0.71
February	1.5739	2.6627	0.4541	0.58
March	1.5297	2.6571	0.4239	0.42
April	1.5645	2.6568	0.4048	0.15
May	1.4462	2.7344	0.3500	0.08
June	1.4866	2.8952	0.3113	(0.57)
July	1.6556	3.0430	0.3123	(0.74)
August	1.8339	3.1211	0.3462	(0.60)
September	2.0047	3.2521	0.3971	(0.83)
October	2.1136	3.7278	0.4340	(1.84)
November	2.0218	3.7172	0.4624	(0.85)
December	1.7276	3.3113	0.4758	0.51
Simple Average	1.7230	3.0426	0.4063	(0.25)
Wtd. Average	1.6915	2.9830	0.4125	(0.09)

1/ The producer price differentials for the Pacific Northwest Order are subject to applicable location adjustments. The effects of location adjustments are not dealt with in this study.

#### Arizona Order

<u>Month</u>	Skim <u>Price 2/</u> \$ / hundredweight	Butterfat <u>Price 2/</u> \$ / pound
January	12.52	1.7264
February	11.75	1.6002
March	11.37	1.5510
April	10.93	1.5635
May	10.50	1.4680
June	10.35	1.4832
July	10.98	1.6276
August	11.80	1.8022
September	12.45	1.9781
October	13.35	2.0987
November	14.00	2.0451
December	13.89	1.7891
Simple Average	11.99	1.7278
Wtd. Average	11.93	1.7138

2/ The producer prices for the Arizona Order are subject to applicable location adjustments. The effects of location adjustments are not dealt with in this study.

# AGGREGATED COMPONENT TESTS BY SIZE-RANGE OF PRODUCER MILK DELIVERIES

### 2012

(See Figure A-7)

### Pacific Northwest Order

Size Ra	ange				
Equal to or	Less				
more than	<u>than</u>	<b>Butterfat</b>	<u>Protein</u>	Other Solids	<b>Producers</b>
- pounds -	- pounds -	- % -	- % -	- % -	
	50,000	4.14	3.23	5.62	293
50,000	100,000	4.17	3.24	5.66	435
100,000	200,000	4.17	3.25	5.67	982
200,000	300,000	4.06	3.21	5.68	727
300,000	400,000	3.99	3.18	5.72	470
400,000	500,000	3.98	3.20	5.71	319
500,000	600,000	3.96	3.20	5.71	336
600,000	700,000	3.95	3.22	5.72	337
700,000	1,000,000	3.84	3.16	5.74	608
1,000,000	2,000,000	3.78	3.14	5.74	1,023
2,000,000	3,000,000	3.76	3.17	5.74	386
3,000,000	4,000,000	3.82	3.16	5.74	155
4,000,000	6,000,000	3.70	3.12	5.74	173
6,000,000	, ,	3.77	3.23	5.74	137
-,					
Weighted A	Average	3.81	3.17	5.74	6,381

# Table A-7 (Continued)

# AGGREGATED COMPONENT TESTS BY SIZE-RANGE OF PRODUCER MILK DELIVERIES

#### 2012

(See Figure A-7)

# Arizona Order

Size Ra	ange		
Equal to or	Less		
<u>more than</u>	<u>than</u>	<u>Butterfat</u>	Producers
- pounds -	- pounds -	- % -	
	200,000	3.90	19
200,000	300,000	3.63	13
300,000	400,000	4.03	6
400,000	500,000	3.89	12
500,000	600,000	3.93	10
600,000	700,000	3.57	7
700,000	1,000,000	3.57	60
1,000,000	2,000,000	3.73	235
2,000,000	3,000,000	3.66	209
3,000,000	4,000,000	3.63	133
4,000,000	5,000,000	3.60	143
5,000,000	6,000,000	3.52	86
6,000,000	7,000,000	3.48	78
7,000,000		3.45	133
Waightad	Average	2 55	1 1 1 1
vveignied /	Average	3.35	1,144

# AGGREGATED COMPONENT VALUES BY SIZE-RANGE OF PRODUCER MILK DELIVERIES

#### 2012

#### (See Figure A-8)

# Pacific Northwest Order

Size Range				Percent of			Weighted
Equal to or	Less	Aggregated	Producer	Producer		Percent of	Average
more than	<u>than</u>	Component Values 1/	<u>Milk</u>	<u>Milk</u>	Producers	Producers	Value
- pounds -	- pounds -	- dollars -	- pounds -	- % -		- % -	- dollars/cwt
	50,000	\$ 1,880,326.53	9,841,779	0.15%	293	4.59%	19.11
50,000	100,000	6,102,221.92	31,840,111	0.48%	435	6.82%	19.17
100,000	200,000	27,000,779.72	141,066,495	2.11%	982	15.39%	19.14
200,000	300,000	33,657,577.67	179,619,012	2.69%	727	11.39%	18.74
300,000	400,000	29,960,213.27	162,336,440	2.43%	470	7.37%	18.46
400,000	500,000	26,603,286.50	143,708,817	2.15%	319	5.00%	18.51
500,000	600,000	34,654,240.57	185,166,193	2.77%	336	5.27%	18.72
600,000	700,000	40,639,386.35	219,086,905	3.28%	337	5.28%	18.55
700,000	1,000,000	92,870,600.78	509,862,931	7.64%	608	9.53%	18.21
1,000,000	2,000,000	270,956,957.95	1,497,669,143	22.43%	1,023	16.03%	18.09
2,000,000	3,000,000	168,143,619.84	933,403,141	13.98%	386	6.05%	18.01
3,000,000	4,000,000	99,675,034.60	543,422,377	8.14%	155	2.43%	18.34
4,000,000	6,000,000	144,055,930.78	811,659,310	12.16%	173	2.71%	17.75
6,000,000		238,559,726.32	1,308,274,951	19.59%	137	2.15%	18.23
Total/Weighted	Average	\$ 1,214,759,902.78	6,676,957,605	100.00%	6,381	100.00%	18.19

### Table A-8 (Continued)

### AGGREGATED COMPONENT VALUES BY SIZE-RANGE OF PRODUCER MILK DELIVERIES

### 2012

(See Figure A-8)

# Arizona Order

Size Range						Percent of			Weighted
Equal to or	Less		Aggregated	Produce	er	Producer		Percent of	Average
more than	<u>than</u>	<u>Co</u>	<u>mponent Values 1/</u>	<u>Milk</u>		<u>Milk</u>	Producers	Producers	<u>Value</u>
- pounds -	- pounds -	- dollars -		- dollars pounds % -			- % -	- dollars/cwt	
	200,000	\$	218,788.29	1,211	,365	0.03%	19	1.66%	18.06
200,000	300,000		614,804.12	3,172	2,360	0.07%	13	1.14%	19.38
300,000	400,000		421,774.45	2,149	9,657	0.05%	6	0.52%	19.62
400,000	500,000		1,001,316.71	5,331	,240	0.12%	12	1.05%	18.78
500,000	600,000		1,022,574.27	5,606	6,060	0.12%	10	0.87%	18.24
600,000	700,000		824,595.75	4,566	5,881	0.10%	7	0.61%	18.06
700,000	1,000,000		9,556,965.91	52,645	5,503	1.16%	60	5.24%	18.15
1,000,000	2,000,000		64,453,409.64	355,269	9,824	7.80%	235	20.54%	18.14
2,000,000	3,000,000		92,805,442.27	517,566	6,203	11.36%	209	18.27%	17.93
3,000,000	4,000,000		81,620,456.49	462,684	1,886	10.16%	133	11.63%	17.64
4,000,000	5,000,000		114,410,914.65	637,211	,303	13.99%	143	12.50%	17.95
5,000,000	6,000,000		81,974,994.65	471,024	1,389	10.34%	86	7.52%	17.40
6,000,000	7,000,000		85,914,861.96	499,823	3,984	10.97%	78	6.82%	17.19
7,000,000			266,509,401.20	1,537,414	1,811	33.75%	133	11.63%	17.33
Total/Weighted Average		\$	801,350,300.37	4,555,678	3,466	100.00%	1,144	100.00%	17.59

1/ Based on Federal order minimum prices. Producer prices for the two orders are subject to location adjustments. The effects of location adjustments are not dealt with in this study.

# STATISTICAL DATA FOR PRODUCERS ON THE PACIFIC NORTHWEST ORDER INCLUDED IN COMPONENT ANALYSIS

# LONG TERM TRENDS: 2000-2012

### Butterfat

	Weighted		Standard				Number of
Year	<u>Average</u>	Mean	<b>Deviation</b>	<u>Median</u>	<u>Minimum</u>	<u>Maximum</u>	<b>Observations</b>
	- % -	- % -	- % -	- % -	- % -	- % -	
2000	<u>3.65</u>	3.78	0.37	3.71	2.39	6.27	12,872
2001	3.66	<u>3.76</u>	<u>0.36</u>	<u>3.69</u>	<u>2.14</u>	<u>6.47</u>	<u>14,106</u>
2002	3.68	3.78	<u>0.36</u>	3.70	2.38	6.11	12,321
2003	3.66	3.77	<u>0.36</u>	<u>3.69</u>	2.74	5.76	9,947
2004	3.68	3.79	0.37	3.71	2.43	5.66	9,946
2005	3.67	3.80	0.37	3.72	2.36	5.57	9,808
2006	3.69	3.82	<u>0.36</u>	3.75	2.49	<u>5.47</u>	9,352
2007	3.70	3.85	0.39	3.76	2.60	5.86	8,454
2008	3.67	3.84	0.39	3.75	2.60	5.65	7,319
2009	3.71	3.87	0.41	3.78	2.62	5.83	7,487
2010	3.73	3.89	<u>0.43</u>	3.79	2.74	6.10	7,588
2011	3.77	3.92	<u>0.43</u>	3.82	2.70	6.21	7,314
2012	<u>3.81</u>	<u>3.96</u>	0.42	<u>3.87</u>	<u>2.78</u>	6.20	<u>6,381</u>
Difference	between <u>maxim</u>	<b>um</b> and <u>mi</u>	inimum:				
	0.16	0.20	0.07	0.18	0.64	1.00	7,725

# Table A-9 (Continued)

# STATISTICAL DATA FOR PRODUCERS ON THE PACIFIC NORTHWEST ORDER INCLUDED IN COMPONENT ANALYSIS

# LONG TERM TRENDS: 2000-2012

### Protein

	Weighted		Standard				Number of
Year	<u>Average</u>	<u>Mean</u>	<b>Deviation</b>	<u>Median</u>	<u>Minimum</u>	<u>Maximum</u>	<b>Observations</b>
	- % -	- % -	- % -	- % -	- % -	- % -	
2000	<u>3.02</u>	3.09	0.20	<u>3.04</u>	2.54	4.37	12,872
2001	3.04	3.10	0.20	3.06	2.35	<u>4.48</u>	<u>14,106</u>
2002	3.05	3.10	<u>0.19</u>	3.06	2.51	4.31	12,321
2003	3.04	<u>3.08</u>	<u>0.19</u>	<u>3.04</u>	2.56	4.14	9,947
2004	3.05	3.10	0.20	3.06	2.36	4.20	9,946
2005	3.05	3.10	0.20	3.06	2.55	4.14	9,808
2006	3.07	3.11	0.20	3.07	2.21	<u>4.09</u>	9,352
2007	3.09	3.14	0.21	3.10	2.17	4.42	8,454
2008	3.09	3.14	0.21	3.10	2.58	4.28	7,319
2009	3.11	3.16	<u>0.22</u>	3.11	<u>2.63</u>	<u>4.09</u>	7,487
2010	3.15	3.18	<u>0.22</u>	3.13	<u>2.13</u>	4.40	7,588
2011	<u>3.17</u>	3.18	<u>0.22</u>	3.13	2.58	4.43	7,314
2012	<u>3.17</u>	<u>3.19</u>	<u>0.22</u>	<u>3.15</u>	2.47	4.31	<u>6,381</u>
Difference b	petween <u>maxim</u>	<b>um</b> and <u>mi</u>	nimum:				
	0.15	0.11	0.03	0.11	0.50	0.39	7,725

# Table A-9 (Continued)

# STATISTICAL DATA FOR PRODUCERS ON THE PACIFIC NORTHWEST ORDER INCLUDED IN COMPONENT ANALYSIS

# LONG TERM TRENDS: 2000-2012

# Other Solids

	Weighted		Standard				Number of
Year	<u>Average</u>	<u>Mean</u>	<b>Deviation</b>	<u>Median</u>	<u>Minimum</u>	<u>Maximum</u>	<b>Observations</b>
	- % -	- % -	- % -	- % -	- % -	- % -	
2000	5.71	5.69	0.07	5.70	4.86	5.98	12,872
2001	5.70	5.68	0.08	5.69	4.55	6.05	14,106
2002	5.71	5.68	0.09	5.69	4.61	6.04	12,321
2003	<u>5.69</u>	<u>5.66</u>	0.10	<u>5.67</u>	4.56	6.00	9,947
2004	<u>5.69</u>	<u>5.66</u>	0.10	<u>5.67</u>	4.48	5.94	9,946
2005	5.71	5.67	0.10	5.69	<u>4.23</u>	5.95	9,808
2006	5.70	5.67	<u>0.11</u>	5.69	4.84	<u>6.15</u>	9,352
2007	5.71	5.68	0.09	5.70	4.78	5.93	8,454
2008	5.70	5.67	0.09	5.69	4.86	5.99	7,319
2009	<u>5.69</u>	5.67	0.09	5.68	<u>4.96</u>	<u>5.87</u>	7,487
2010	5.71	5.68	0.09	5.70	4.71	5.92	7,588
2011	5.73	5.70	0.09	<u>5.72</u>	4.86	6.01	7,314
2012	<u>5.74</u>	<u>5.71</u>	0.09	<u>5.72</u>	4.62	5.95	<u>6,381</u>
Difference k	petween <u>maxim</u>	<b>um</b> and <u>mi</u>	nimum:				
	0.05	0.05	0.04	0.05	0.73	0.28	7,725

# STATISTICAL DATA FOR PRODUCERS ON THE ARIZONA ORDER INCLUDED IN COMPONENT ANALYSIS

# LONG TERM TRENDS: 2000-2012

### Butterfat

	Weighted		Standard				Number of
Year	<u>Average</u>	<u>Mean</u>	<b>Deviation</b>	<u>Median</u>	<u>Minimum</u>	<u>Maximum</u>	<b>Observations</b>
	- % -	- % -	- % -	- % -	- % -	- % -	
2000	3.62	<u>3.65</u>	<u>0.27</u>	<u>3.62</u>	2.91	4.96	<u>1,464</u>
2001	3.62	3.63	0.28	3.60	2.76	5.01	1,378
2002	<u>3.63</u>	<u>3.65</u>	<u>0.27</u>	<u>3.62</u>	<u>2.99</u>	4.92	1,298
2003	3.59	3.62	0.30	3.57	2.38	4.94	1,268
2004	3.61	3.64	0.30	3.59	2.81	4.87	1,136
2005	3.59	3.63	0.33	3.58	2.62	4.92	<u>1,048</u>
2006	3.59	3.62	0.32	3.56	2.94	4.88	1,099
2007	3.59	3.63	0.32	3.58	2.62	<u>4.86</u>	1,112
2008	3.56	3.59	0.33	3.53	2.87	5.07	1,187
2009	<u>3.49</u>	<u>3.54</u>	0.33	<u>3.48</u>	2.59	<u>5.60</u>	1,162
2010	3.50	3.55	<u>0.36</u>	3.51	<u>2.36</u>	5.45	1,157
2011	3.55	3.61	0.33	3.54	2.48	4.99	1,195
2012	3.55	3.63	0.33	3.55	2.98	5.46	1,144
Difference b	petween <u>maxim</u>	<b>um</b> and <u>mi</u>	<u>nimum</u> :				
	0.14	0.11	0.09	0.14	0.63	0.74	416

#### Figure A-1 FREQUENCY DISTRIBUTION OF MONTHLY AVERAGE BUTTERFAT LEVELS 2012 Pacific Northwest Order

Number of Observations



Figure A-2 FREQUENCY DISTRIBUTION OF MONTHLY AVERAGE PROTEIN LEVELS 2012 Pacific Northwest Order

Number of Observations



#### Figure A-3 FREQUENCY DISTRIBUTION OF MONTHLY AVERAGE OTHER SOLIDS LEVELS 2012 Pacific Northwest Order

Number of Observations



Figure A-4 FREQUENCY DISTRIBUTION OF MONTHLY AVERAGE BUTTERFAT LEVELS 2012 Arizona Order

Number of Observations



# Figure A-5 SCATTER PLOT OF PROTEIN AND BUTTERFAT MAY AND NOVEMBER 2012 Pacific Northwest Order





# Figure A-6 SCATTER PLOT OF OTHER SOLIDS AND BUTTERFAT MAY AND NOVEMBER 2012 Pacific Northwest Order





# Figure A-7 WEIGHTED AVERAGE COMPONENT LEVELS BY SIZE-RANGE OF PRODUCER MILK DELIVERIES 2012



**Pacific Northwest Order** 

Arizona Order



size range (1,000 pounds)

### Figure A-8 WEIGHTED AVERAGE VALUES AND PERCENT OF PRODUCERS & PRODUCER MILK BY SIZE-RANGE OF PRODUCER MILK DELIVERIES 2012



#### **Pacific Northwest Order**

Arizona Order



size range (1,000 pounds)

Map A-1 MARKETING AREA OF THE PACIFIC NORTHWEST (FO 124) AND ARIZONA (FO 131) ORDERS



Map A-2 GEOGRAPHIC REGIONS ENCOMPASSING THE PACIFIC NORTHWEST AND ARIZONA ORDERS' MILK SHEDS, 2012



\* Note: Region 7 also includes Bailey and Parmer Counties, Texas. They were excluded due to space limitations.