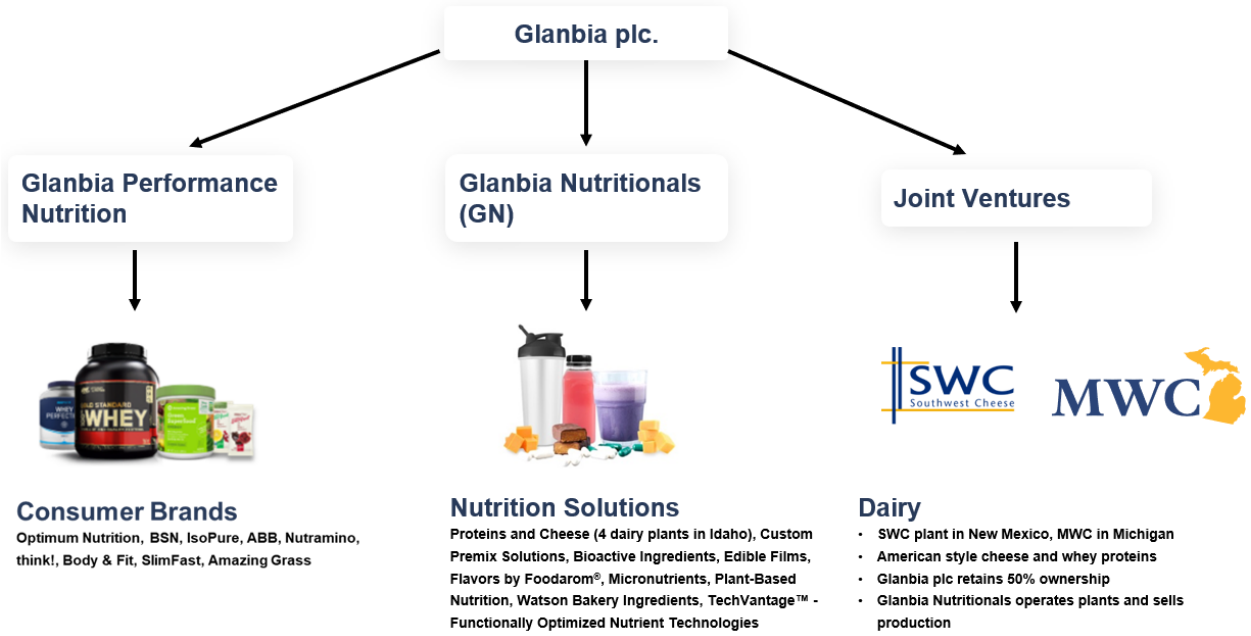
TESTIMONY OF GLANBIA NUTRTIONALS RESPECT TO PROPOSALS 3, 4, 6, 7, 8, 9, 10, AND 11
AUGUST-SEPTEMBER 2023 FEDERAL MILK ORDER HEARINGS
DOCKET NO. 23-J-0067; AMS-DA-0031

Introduction:

My name is James DeJong and am currently the Senior Director of Dairy Economics, Risk Management, and Sales Planning for Glanbia Nutritionals (GN), whom I am representing today. I work out of GN's corporate office at 121 4th Ave S, Twin Falls, Idaho 83301.

I have worked for GN the last 5 years. My main responsibilities include market and industry intelligence, milk pricing analysis, hedging dairy commodity price risk, and balancing our internal supply and demand for whey proteins. Prior to that, I worked for Hilmar Cheese four and one-half years and at Rabobank for three years. At Hilmar Cheese, I worked as their Dairy Economist, dairy commodity and energy price risk manager, and also as their Strategic Planner. For Rabobank, I worked for their Food and Agricultural Research and Advisory division as an Agricultural Analyst. There I specialized in dairy industry economics, general California agricultural economics, US row crops, and economics of North American forest products. I have a bachelor's degree in social science and a master's degree in public administration from California State University Stanislaus.

As to the background of our company, GN is part of Glanbia plc, a global nutrition company based in Ireland. Glanbia plc includes GN (business to business sales only), Glanbia Performance Nutrition (business to consumer brands such as Optimum Nutrition), and our Joint Ventures (which include Southwest Cheese and MWC cheese/whey plants). You can see our basic company organization below.



I am here to represent GN and our 50% ownership interest in the two Joint Venture cheese/whey plants. Our partners in our Joint Venture plants, Dairy Farmers of America and Select Milk Producers, are not represented in this testimony.

GN is a diversified nutrition solutions company that specializes in custom pre-mix solutions, bioactive ingredients, flavors, micronutrients, plant-based nutrition solutions, bakery ingredients, as well as American style cheeses and high concentrate whey proteins. Specifically, to the dairy segment of our business, GN fully owns four dairy plants in Idaho that process a combined 12 million pounds of milk a day and turn that milk into barrel cheese, block cheese, high concentrate whey proteins, proprietary protein blends and lactose. Our Idaho plants operate outside the Federal Milk Marketing Order (FMMO) system. Our Joint Venture plants in New Mexico (FMMO 126) and Michigan (FMMO 33) process a combined 22 million pounds of milk per day and turn it into American style block cheese and high concentrate whey proteins. Our combined output between our fully owned and Joint Venture plants makes us the largest American style cheese manufacturer and the largest whey-based nutritional solutions provider in the US.

Further, although not all our plants fall within the FMMO marketing areas, we still have a substantial stake in the maintenance and proper functioning of the FMMO system. This is

especially true in the case of the Class III milk price, on which my testimony will focus. Our plants make the type of cheddar cheese represented in the Class III formula, compete locally and nationally with other dairy manufactures that rely on the FMMO pricing system, and ourselves and our patron milk suppliers utilize the risk management tools that are linked to the FMMO pricing system.

Proposals 8 and 9: Make allowances proposed by Wisconsin Cheese Makers Association and International Dairy Foods Association

GN supports the make allowance proposals from Wisconsin Cheese Makers Association (WCMA) and the International Dairy Foods Association (IDFA). The WMCA and IDFA proposal uses an average of the Dr. Schiek study (which uses the 2016 California Department of Agriculture audited manufacturing cost study adjusted with inflation indexes) and the last manufacturing cost survey from Dr. Mark Stephenson using 2022 plant survey data.

Why the WMCA/IDFA make allowance proposal should be adopted

We believe the data from these studies should be used because there is a higher degree of transparency and USDA has precedent for using similar studies in past FMMO decisions. IDFA's testimony discusses past USDA precedent for using high quality and data driven research to establish make allowances. Further, as the largest processor of cheddar cheese in the US, all five of our cheddar plants participated in the last 2022 Stephenson cost study, which includes our Joint Venture plants as well.

GN supports the $0.0015 per lb. marketing allowance cost addition

GN supports the $0.0015 per lb. marketing cost addition to the WMCA and IDFA make allowance proposal. On one hand, marketing costs have risen like other costs due to inflation. On the other hand, one could also argue that industry consolidation has reduced the amount of resources needed to sell cheese domestically. In balance, we ask that the $0.0015 per lb. marketing cost be included in the final make allowance as it was in the previous FMMO make allowance decision.

Why make allowances need to be maintained

GN believes FMMO make allowances must be maintained to reflect reality. The FMMO system relies on these make allowances to set minimum pricing and distribute pool revenues, while the industry uses these prices to make investment decisions, set the pricing of milk, and are heavily used in CME and USDA risk management tools. However, when these make allowances are not maintained, as they haven't been in 15 years, we can expect to see market distortions and further real-world variances versus the USDA announced Class prices.

Looking at USDA published data, we can see declining Mailbox milk prices versus Uniform milk prices at test (Figure 2-5). The analysis in these figures takes the USDA Mailbox milk prices from four states/regions then subtracts the order's Uniform Price at the order's weighted average milk components. The purpose of the analysis is to illustrate how actual producer milk prices have changed over time versus the regulated price at real world milk components. For example, in Wisconsin the Mailbox milk price from Oct 2008 to Sept 2010 averaged $14.42 per cwt., while the Uniform milk price at test (using the $1.70 zone PPD) averaged $13.54 per cwt. This equals an $0.88 per cwt. positive variance versus the Uniform price at test. However, from May 2021 to April 2023 (last available data), the Wisconsin Mailbox price averaged $21.78 per cwt. while the Uniform milk price at test (again using the $1.70 zone PPD) averaged $22.21 per cwt. This equals a $0.43 per cwt. negative variance versus the uniform price at test and a $1.31 per cwt. negative total swing over this period.

What this data shows is that there is a "bumping up" of the mailbox price against FMMO Uniform Prices – in other words, the market is trying to take the actual pay price below the FMMO minimum price. That is a sign that the minimum price is too high, and the price is too high in large part because of the inaccurate make allowances. While other factors, like higher milk hauling costs, changes in checkoff program amounts, or variances in milk components will cause noise in the analysis, the trendline is unmistakable. Further, the other 3 regions analyzed (Figures 3-5) that are inside FMMOs show the same pattern of collapsing milk premiums versus the FMMO Uniform prices. We believe a good portion of this collapse is attributed to extremely

outdated make allowances. There is a summary of the total swing in Mailbox prices versus the Uniform price at test for the four areas in the Appendix section.

Milk premiums take over when FMMO milk prices are below competitive levels

We believe there is more industry risk when regulated milk prices are set too high, versus too low. When FMMO milk prices are set too low in a milk shed, historically speaking, market premiums over the Class prices take hold. Looking at **Figures 3-5** again, in the early years following the 2008 make allowance change, Mailbox prices were relatively strong versus the Uniform Prices at test in multiple regions. In this case, dairy processors had extra margin over the FMMO Class prices that was then diverted to pay for premiums. Given milk cooperatives control about 85% of all the milk in the US[1], this places them in an extremely strong position to bargain for premiums above the FMMO Class prices – providing enough value is being generated from dairy products in that milk shed. If make allowances were set too high in some milk sheds, market principles will take over and premiums will again become common.

Importance of make allowances for pooling dollar distribution

In the case of FMMO pooling revenue distribution, when the Class III and IV make allowances are not reflective of reality, a situation can be created where pool revenues are not distributed in a fair or economical justifiable manner. For example, if the Class III make allowances were too low (creating an artificially high Class III price), but set too high for Class IV (creating an artificially low Class IV price), Class IV milk handlers would have an unfair advantage because pool dollars flow to the lowest Class value of milk. In this case, the Class IV handlers could be financially strong while also pulling in extra pool revenue, while the Class III handler could be struggling while not getting any pool revenue (or worse, paying into the pool). The oppositive situation could exist between Class III and IV depending in which direction the make allowances were distorted. In the end, the point proves USDA needs to maintain accurate make allowances to ensure the FMMO

[1] Marketing Operations of Dairy Cooperatives 2017 (usda.gov) https://www.rd.usda.gov/files/publications/RR234MarketingOperationsofDairyCooperatives2017.pdf

pooling system is functioning equitably for producers. Failing to correct make allowances with the best available data, or delaying their implementation, will create disorderly marketing.

Impact of higher manufacturing costs on GN

GN's costs have gone up considerably since the Class III make allowance were last changed in 2008. Our Twin Falls, Idaho plant, which processes about 2.5m milk lbs. per day, is our best plant to compare costs over time since it only makes American style cheese (mostly cheddar), does not dry any whey, and has been minimally changed over the years. Our other plants have seen major expansions or whey processing investments over the years that make them more difficult to compare versus 2008. For our Twin Falls, Idaho plant from 2008 to 2022, we have seen some costs like energy only go up slightly (lower natural gas cost combined with energy efficiency projects), items like direct labor and packing go up about 30%, and some items have gone up considerably more – like plant insurance, which was up over 70%. Overall, we have seen total costs from 2008 to 2022 increase at a similar rate as reflected in the Stephenson and Schiek cost studies.

Additionally, we have also seen higher costs arise on the regulatory and sustainability front. For example, regulatory costs related to the Food Safety Modernization Act have produced massive increases in testing and analysis requirements. Sustainability related costs have also skyrocketed. We have invested in more sustainable packing, plant upgrades that reduce carbon output and waste, $2.5m per unit water polishers that allow plant water to be re-used many times over (often multiple polishers are required per plant), and investment in personnel who monitor dairies and enforce on-farm sustainability requirements. It is extremely difficult to extract market premiums for our regulatory and sustainability efforts. It is often looked at as the cost of doing business today.

Many of our 2023 costs will be even higher than 2022 given the persistent inflation in the broader economy. This includes items like labor, where we see fierce competition for workers with other manufactures, but also the cost to replace dairy processing equipment. We estimate the cost to build the 8 million milk pound per day MWC cheese and whey plant with our Joint Venture Partners, which was completed in late 2019 and early 2020, would have gone from about $470m

originally to about $600m - $700m if it was built today. If $650m is used as the midpoint, this is a 38% increase in just a few years. This increase in plant equipment costs is reflected in things like replacement silos, electric motors, water polishers, various electrical equipment, and countless other parts that keep a cheese plant running.

GN fights to keep manufacturing costs low

While our manufacturing costs have undoubtably increased over the years, we also go to extreme lengths to try to keep costs as low as possible. This includes negotiating with vendors and various suppliers to get the most competitive pricing, while also investing heavily in plant equipment and technology to control costs. For example, since the last make allowance adjustment in 2008, we have spent countless millions of dollars on projects such as recovering biogas from lost milk components in waste water, heat exchange systems that take cold water from the milk and use it to cool other systems in the plant, automation projects that reduce labor costs, and right sizing equipment (for example doing analysis to determine the minimum pump size needed). Further, our newest Joint Venture Plant, MWC in Michigan, incorporates a lot of the latest efficiency learnings into its design.

New cheese plant investors working around regulated system

Cheese processing growth outside of FMMO regulation is creating additional cheese capacity that competes directly with manufacturers regulated under Federal Orders. These plants have been able to attract the milk needed at prices outside the FMMO minimums, making it hard for many regulated plants to compete for cheese sales at the price that generates margins sufficient to pay the regulated price. This can contribute to disorderly marketing where pooled plants would be at a financial disadvantage to those who don't pool or operate outside the system.

Cheese manufactures cannot raise prices to recover losses

For most industries, raising prices is one of the most common ways to offset higher costs. However, raising prices for dairy products that are reported in the NDPSR survey creates a feedback loop. For example, if over the course of a few years cheddar cheese manufactures raised their overage versus the CME cheese price by 1 cent per lb., this would then be fed back

into the Class III protein price and increase the price of milk commensurately. In this case the manufacturer has not gained anything, but nonetheless must still increase their overage over the CME spot market or risk falling behind the NDPSR price in Class III. Without make allowance increases, the only way for a manufacturer of NDPSR reported products to recover higher manufacturing costs is to pursue ruthless efficiency, look for opportunities outside NDPSR reported products, look for escape valves out of the Class III price, invest outside the FMMO regulated dairy industry, or invest outside of dairy.

Proposal 7: Make Allowances proposed by National Milk Producers Federation

GN supports the make allowance proposal brought forth by Wisconsin Cheese Makers Association and the International Dairy Foods Association because it is well-supported by studies (studies which I understand were shared before the start of this hearing). In contrast, the National Milk Producers Federation (NMPF) proposal lacks transparency. While NMPF clearly acknowledges the need for updated make allowances in their petition, they offer no methodology to their approach other than to say their, "…make allowance increases represent a fair balance between the producer impact of higher make allowances and the processor impact of make allowances...". This statement, and similar ones later, imply they are asking USDA to ignore a scientific approach to setting minimum FMMO minimum prices and instead use what appears to be a politically negotiated number.

Since the Class III and IV minimum milk pricing series started in the year 2000, USDA has relied on empirical studies to set make allowances. Specifically, they have relied on audited manufacturing costs studies from the California Department of Agriculture (CDFA) and non-audited studies, which are similar to Dr. Stephenson's recent manufacturing cost studies. Furthermore, the make allowance proposed by NMPF is even lower than from the last available audited CDFA study from 2016 for cheese ($0.2400 per lb. proposed versus $0.2454 per lb. in CDFA 2016). Since 2016, we have nearly seven years of cheese manufacturing cost inflation that has not been accounted for.

To conclude this topic, we urge USDA to adopt the data driven approach to make allowance estimates as proposed by WMCA and IDFA.

Proposal 3: Elimination of Cheddar cheese 500-pound barrels from protein price

GN opposes the elimination of 500-pound barrels from the protein price and maintains that the status quo is a better system. While we sympathize with the view that the unstable relationship between block and barrel prices in Class III have caused a variety of problems for the industry, removing the price series from Class III protein would create other, even greater problems.

First, moving Class III to a 100% block weighting would greatly complicate milk pricing for manufactures that make barrel cheese. Barrels produced in the US are almost always sold based on the CME spot barrel price, while Proposal 3 would essentially disconnect Class III milk pricing from the CME barrel (Figure 1). The resulting disconnect between revenue and the Class III milk price could drastically increase margin volatility and ability to compete for milk – even for barrel manufactures outside FMMOs.

Our barrel plant in Gooding, Idaho, which is outside the FMMO system, frequently uses a basis to Class III to buy/sell milk for plant balancing purposes, while most milk handlers and dairy farmers also use Class III as a competitive benchmark in Idaho. The removal of barrels from the protein price would essentially put barrel manufactures and their milk suppliers on an island and disconnected from the Class III price surface. This would be a major strategic risk for our Idaho business, which produces a lot of barrel cheese. While we realize the unpredictable relationship between block and barrel prices in Class III has created challenges in the industry, removing barrels from the protein formula will create more significant industry-wide challenges.

If this issue is going to be further explored, we believe it should be done outside the FMMO system. For example, there has been discussion in the industry about eliminating the CME barrel market. Such a solution would negate the need to remove barrels from the NDPSR since barrels would likely become a reflection of the block market.

Proposal 4: Addition of 640-pound cheddar cheese blocks to protein price

GN opposes the addition of the 640-pound blocks of cheese into the protein price. The first reason we oppose it is because we believe it will not add new information to the survey. In our experience, 640-pound cheddar blocks are virtually always priced off a basis to the CME block cheddar price, so I would expect any NDPSR 640-pound cheddar survey to track virtually perfectly with the current NDPSR 40-pound block cheddar price.

The second reason we oppose adding 640-pound blocks to the Class III price is the risk CME would add a 640-pound cheddar spot market, much like the current CME cheddar block and barrel spot markets. All NDPSR dairy markets currently have a corresponding CME spot market, so it is not a stretch to assume CME would also add 640-pound blocks. The problem with a 640-pound CME block market is the fact there is a smaller pool of buyers and sellers versus the more liquid 40-pound block market on the CME. A small number of buyers and sellers could more easily sway a CME 640-pound block market in ways that are not helpful to the larger industry or dairy producers linked to Class III. Basically, 640-pound blocks on the CME spot market could become "barrels 2.0" in the Class III price with unpredictable and volatile relationships to the current 40-pound block price, which would then feed into the Class III protein formula. In future hearings, petitioners could be asking to take out 640-pound blocks from the Class III protein price for the same reasons we are discussing taking out barrels today. In summary, we would ask USDA to reject Proposal 4.

Proposal 6: Addition of Mozzarella to the protein price

GN opposes the proposal to add mozzarella to the Class III protein price for several reasons. First, the mozzarella price would be difficult to incorporate into the Class III protein price formula. Mozzarella has very different fat, solids-nonfat and moisture levels compared to a very standard cheddar cheese, which is the current foundation of the Class III protein formula. To integrate mozzarella into the protein price would require a separate and unique protein formula that is weighted into the current cheddar-based protein formula. Depending on the weightings of

cheddar versus mozzarella in a new NDPSR price survey, the protein formula would be constantly changing.

Second, mozzarella has many different specifications, some of which are made to order for specific customers. Unless one specification was identified as accurate to use in the protein formula, even more protein formulas would be needed to account for the different product compositions. In this case, USDA would need to survey a broad spectrum of the mozzarella price surface and weight many different protein formulas – that fluctuate with surveyed weightings – to get an accurate price. Chaos would ensue.

In addition, for the current Class III and IV make allowances from the 2007 decision, the CDFA make allowances data sets and the 2019 and 2022 Stephenson studies only use cheddar cheese in their analysis. A new robust cost study would need to be created for mozzarella and its many variations before it could be integrated into a new Class III protein price formula. This would be very challenging from a time perspective to integrate into the Final Decision since the petitioners have presented no such study. Further, the latest cheddar make allowance data sets have certain level of history and trust built into them which makes them easier to sense check. A new mozzarella study would probably need to be audited, like the past CDFA cheddar studies, to create some level of confidence in the industry.

Lastly, the petitioners imply there are lavish profits associated with the production and sale of mozzarella. Specifically, they point to a competitive USDA bid for consumer packaged mozzarella string cheese, which was awarded at $3.56 to $3.89 per lb.[2] as evidence of excess profits. The first issue is that this was a solicitation for packaged consumer product, not for FOB bulk wholesale product – as is collected through NDPSR for milk pricing. As we know, there can be large price differences between bulk commodity wholesale products and consumer packaged products. The second issue is that, upon searching for generic brand mozzarella string cheese online for pickup at a local Kroger, at the time of this writing, the price was $4.49 per 12oz package ($5.99 per lb.). USDA appears to have gotten a bargain.

[2] https://www.ams.usda.gov//sites/default/files/2000009263%20-%20Bid%20Award.xls

Third, cheese makers are smart for the most part, so if there were extreme profits associated with mozzarella production, huge amounts of investment would follow. Along these lines, there are already cheese makers with plants that can flex production between cheddar and mozzarella to maximize profits. Based on our experience watching markets, these manufactures do flex their production based on expected returns.

Overall, mozzarella does not appear to be as lucrative as the petitioners claim and adding it into the Class III protein price would create chaos. We ask USDA to reject this proposal.

Proposal 10 & 11: Increase butterfat recovery in Class III to 93% and eliminate Class III farm-to-shrink

GN opposes the proposed increase in butterfat recovery and elimination of farm-to-plant shrink. We support the status quo until audited plant cost studies can be completed that show real world yields, shrink, and dairy solids recovery. This issue is very complex with broad ranges for fat recovery in the industry based on plant age and processing techniques. While in our experience many modern plants can achieve 93% cheddar fat recovery (as the petitioner contends) and probably see relatively low farm-to-plant shrink (but not 0%), we believe the proposals only focuses on price enhancing aspects of the Class III formula while ignoring the parts that overvalue milk within Class III.

For example, the current Class III formula incorrectly assumes all excess fat from the cheese making process is recovered. Specifically, at 2.9915% protein and 3.5% fat (standard Class III test) the current formula stipulates 90% of fat goes towards cheese making, with the remaining 10% being recovered as sweet cream which is valued using the NDPSR Grade AA butter price. The 90% cheese fat recovery plus the 10% sweet cream fat recovery add to 100% recovery.

The first problem here is that there is no such thing as a lossless manufacturing system. All plants lose milk solids, which in our case go into wastewater (and often recovered as biogas). While we do not measure farm-to-plant losses, for simplicity we do measure total loss from farm through our entire manufacturing system, primarily through the measurement of milk solids in our wastewater. Even with highly efficient plant equipment and mostly full milk tanker loads, in our

experience modern cheese plants are expected to lose about 1.5% of the purchased milk solids. Specifically for fat, about 1.5% of farm test fat ends up in wastewater primarily because of equipment cleanouts and the milk ultrafiltration process prior to entering the vat. This lost fat is completely unmarketable. To quantify the impact to Class III at standard components (2.9915% protein, 3.5% fat), using $2.3475 per lb. butter (the same 10 year markets as used in the petitioner's analysis), and the current make allowance and butter yield factors, this loss would equal $0.14 per cwt. of milk **(see Figure 6)**.

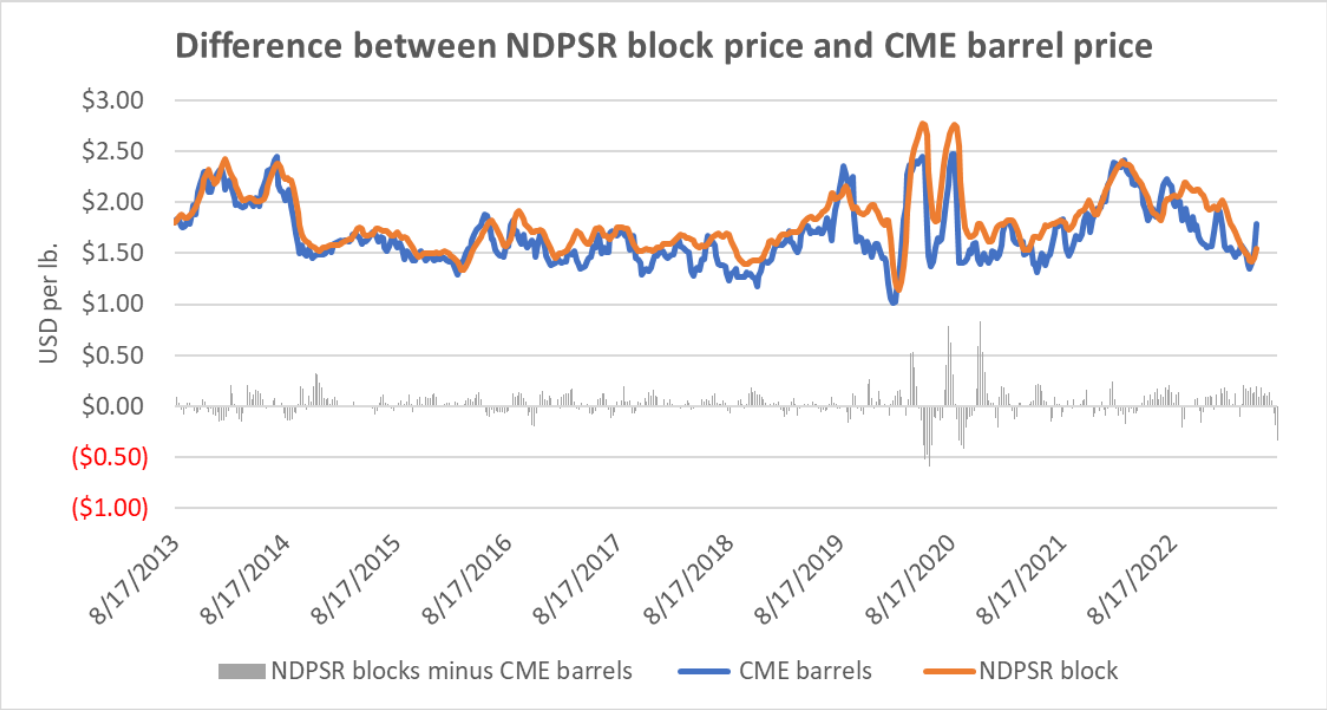
The second problem is that the Class III formula values the remaining 10% of the vat fat not going into cheese (which is called whey cream) using the NDPSR Grade AA butter price. Per USDA regulations, butter with a whey flavor would be assigned as Grade B butter[3]. As such, we see about 20% discounts or more for whey fat versus Grade A sweet cream due to its limited marketability. This discrepancy can easily overvalue Class III fat another $0.17 per cwt **(see Figure 6)**. Further, included in **Figure 7** is an algebraically simplified version of the current Class III protein price and fat value explanation that may make this topic easier to understand.

In summary, we urge USDA to reject Proposals 10 and 11 regarding cheese fat retention and farm-to-plant shrink. The confounding factors identified above would decrease Class III by a combined $0.31 per cwt. versus the $0.12 per cwt. increase Proposals 10 and 11 would bring (using the petitioner's 10-year average market analysis). Given the vast complexity of these issues, difference in plant equipment and operations, and the fact critical parts of the Class III formula overvalue milk, we should wait for a USDA audited cost study to be completed so we can accurately measure real world yield factors across a variety of plants.

[3] USDA, 1989, United States Standards for Grades of Butter, 58.2627 Specifications for U.S. grades of butter, paragraph C, https://www.ams.usda.gov/sites/default/files/media/Butter_Standard%5B1%5D.pdf

Appendix

Figure1: Making Class III 100% block based would disconnect sales price and revenue for barrel manufactures. Last 10 years of data



Source: CME, USDA, 2023

Figure 2: Mailbox milk prices continue to erode versus the Uniform milk prices at test in FMMO 30. Jan 2010 to April 2023

Methodology: USDA Mailbox prices minus the Uniform milk price at test (Uniform milk price at test equals Class III component prices multiplied by the FMMOs average components + that FMMOs PPD at the indicated zone)

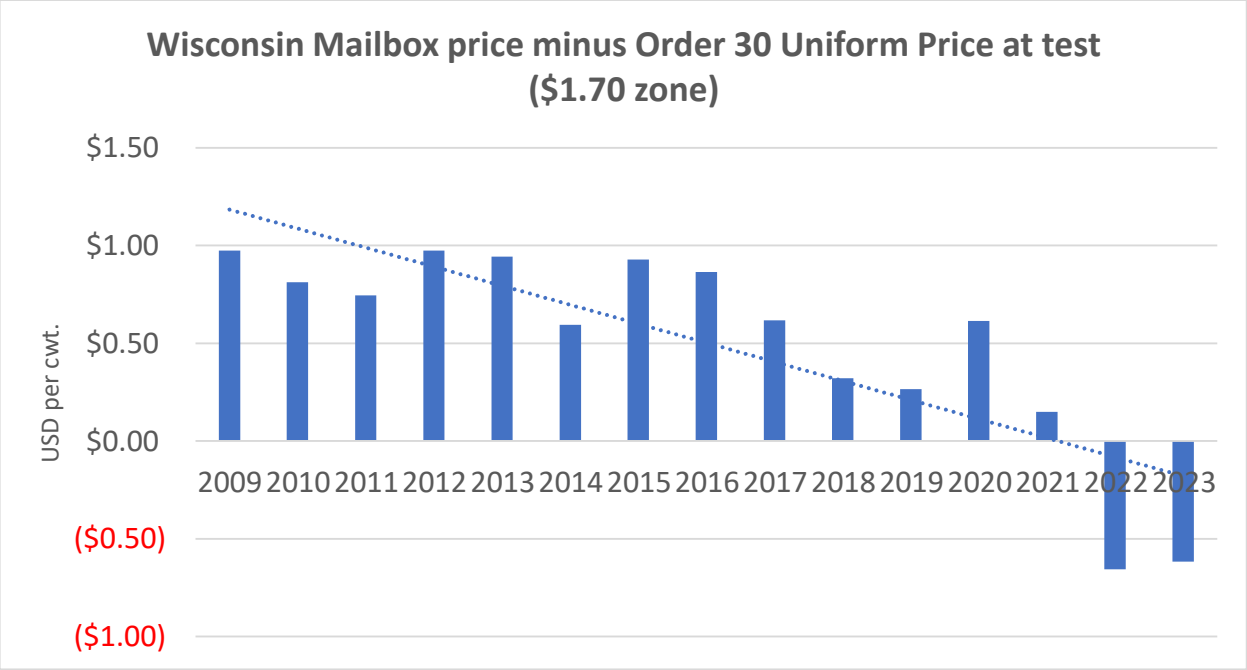


Figure 3: Mailbox milk prices continue to erode versus the Uniform milk prices at test in FMMO 33. Jan 2010 to April 2023

Methodology: USDA Mailbox prices minus the Uniform milk price at test (Uniform milk price at test equals Class III component prices multiplied by the FMMOs average components + that FMMOs PPD at the indicated zone)

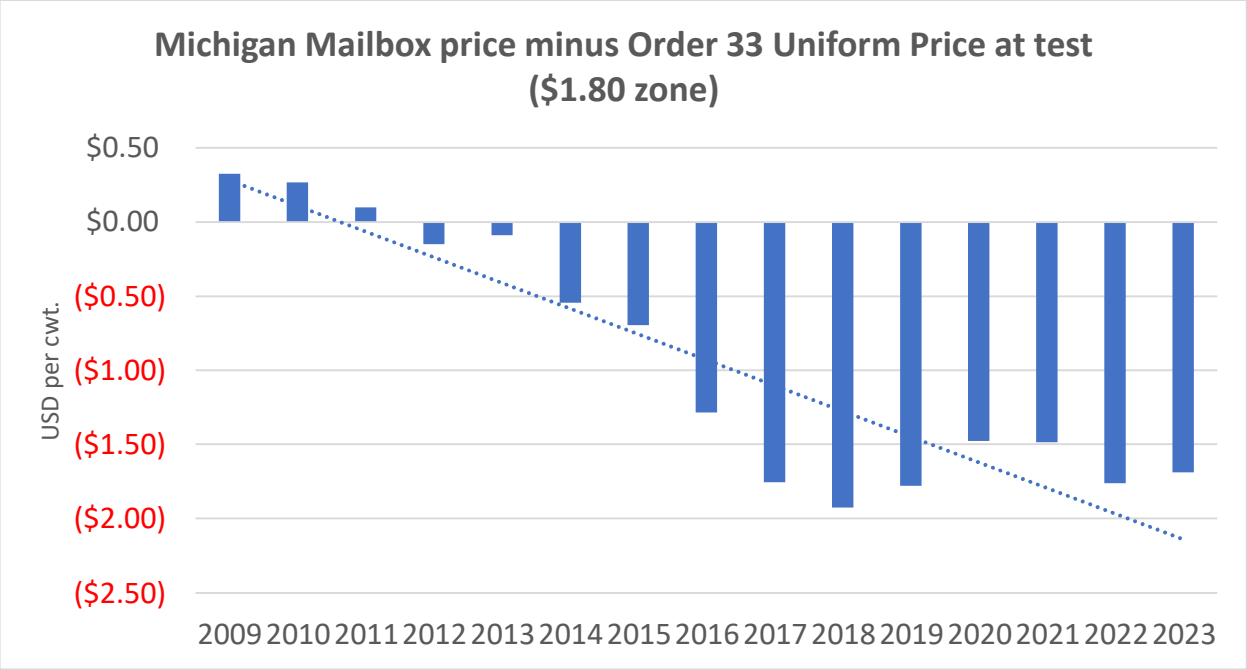


Figure 4: Mailbox milk prices continue to erode versus the Uniform milk prices at test in FMMO 124. Jan 2010 to April 2023

Methodology: USDA Mailbox prices minus the Uniform milk price at test (Uniform milk price at test equals Class III component prices multiplied by the FMMOs average components + that FMMOs PPD at the indicated zone)

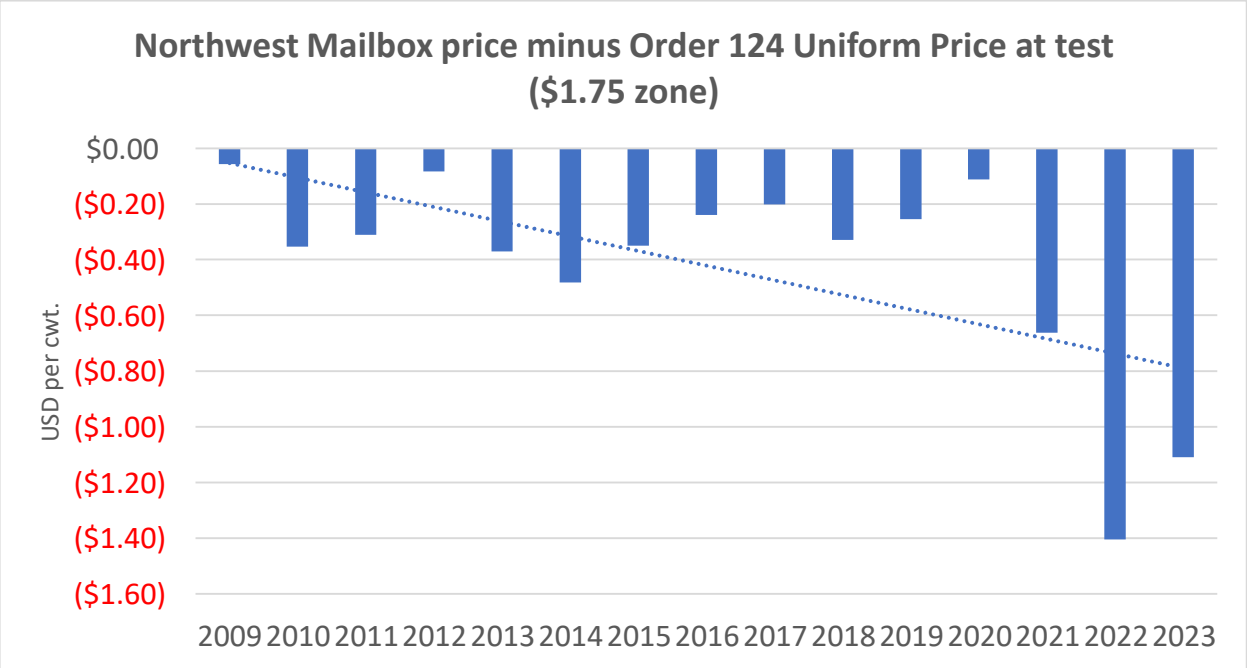
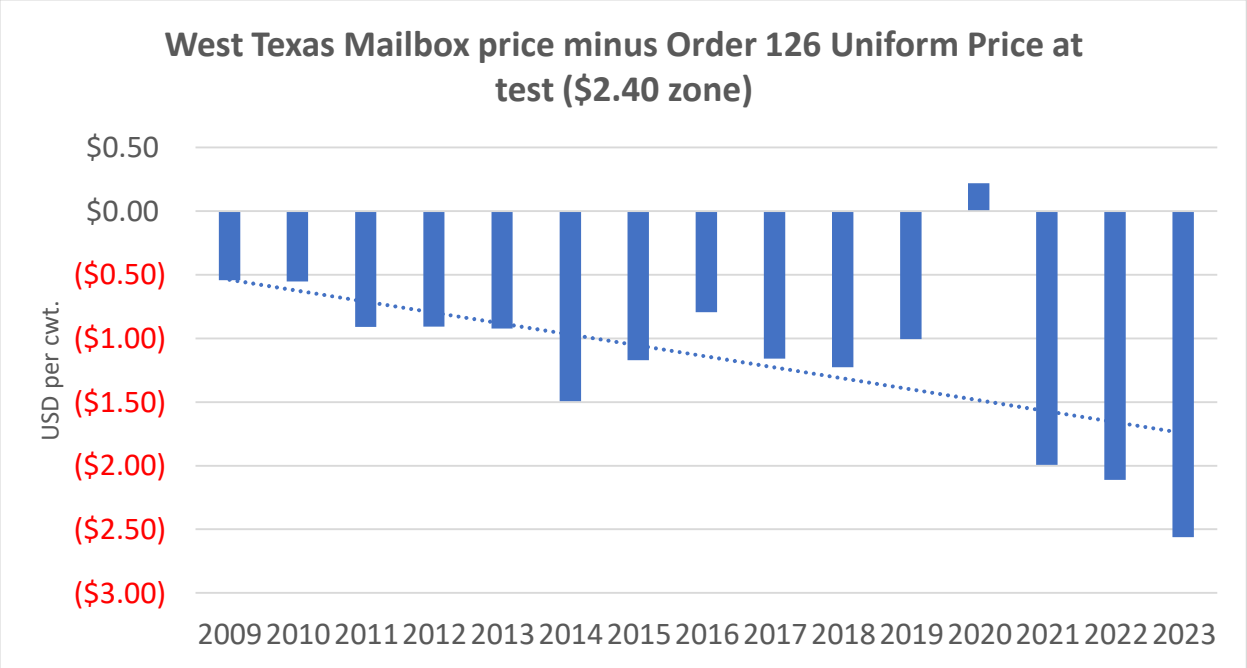


Figure 5: Mailbox milk prices continue to erode versus the Uniform milk prices at test in FMMO 126. Jan 2010 to April 2023

Methodology: USDA Mailbox prices minus the Uniform milk price at test (Uniform milk price at test equals Class III component prices multiplied by the FMMOs average components + that FMMOs PPD at the indicated zone)



Summary of Figures 2-5: Mailbox price minus Uniform price at test

	Upper Midwest	Mideast	Pacific Northwest	Southwest
Oct 2008 - Sept 2010	$0.88	$0.30	-$0.11	-$0.59
May 2021 - Apr 2023	-$0.43	-$1.69	-$1.14	-$2.20
Change	-$1.31	-$1.99	-$1.03	-$1.61

Figure 6: The Class III formula overstates the amount of excess fat recovered in cheese making, then overvalues the whey cream using the AA Grade price

	Current Class III	Actual fat value losses	Notes
Producer fat per cwt.	3.50	3.50	Standard test milk
Fat to cheese	90.00%	90.00%	Fat going into cheese assumption. Producer receives cheese value for this fat
Recovered whey fat	10.00%	8.50%	Recovered whey fat can be re-used to make cheese, sold as whey fat, or end up in whey products
Fat lost in wastewater	0.00%	1.50%	Fat lost in wastewater for highly efficient plant - often turned into biogas
Total recovered fat in products	100.00%	98.50%	Fat in cheese and other recoverable fat - physically impossible to recover 100%
Total	**100.00%**	**100.00%**	Cross check total equals 100%
Grade AA butter price	$2.3475	NA	Per USDA regulation, it is illegal to use whey fat in Grade AA butter
Whey butter price (20% discount)	NA	$1.8780	GN sees substantial discounts for whey fat - sometimes 50% discounts
Make allowance	$0.1715	$0.1715	Current Class III/IV fat make allowance
Butter yield factor	1.2110	1.2110	Current Class III/IV butter yield factor
Net recovered fat value from cheese manufacturing per cwt.	$0.92	$0.61	Current Class III: (Grade AA butter - $0.1715) x 1.211 x 3.5 x 10% Actual fat value: (Whey butter price -$0.1715) x 1.211 x 3.5 x 8.5%
Difference per cwt.	**NA**	**-$0.31**	Difference in fat value per cwt.
Breakdown per cwt.			
Fat value loss to waste water	NA	-$0.14	Lost fat value in wastewater versus current Class III
Fat value loss due to whey cream	NA	-$0.17	Lost fat value due to whey fat discount versus current Class III
Total fat value loss		**-$0.31**	Check: total last fat value versus Class III

Figure 7:

Algebraically simplified current version of Class III protein formula and explanation:

Protein formula: *Round(((cheese price - 0.2003) x 9.6392- fat price x 0.9 x 3.5)/2.9915,4)*

- The 9.6392 comes from multiplying 2.9915 protein by 1.383 (yield per lb. protein) then adding 3.5 fat by 1.572 (yield per lb. fat), which equals 9.6392
- The fat price x 0.9 x 3.5 comes from amount of fat value being retained in the cheese that must be backed out so the formula doesn't double count the fat value. The Class III formula then credits the remaining 10% of fat to the producer at the Class III/IV butterfat price
    - For producers shipping fat above the 2.9915/3.5 fat ratio (such as 2.9915/3.60), the Class III formula credits them for the extra 0.1 lbs. as well. In total, the producer would be credited for a fat value of 3.5 x 10% and the 0.1 of extra fat (0.45 lbs. of fat total) multiplied the Class III/IV fat price.

        - The assumption is that the cheese plant would sell the extra fat not needed to make the cheese, and credit the producer back for this extra fat

- As illustrated in Figure 6, the error in the Class III fat formula assumptions is that it is impossible to recover 100% of the fat, and the portion of fat coming off the cheese vat (3.5 x 10%) is not marketable for use in Grade AA butter.
    - In the case of the extra producer fat (2.9915/3.60 example), only the extra 0.1 of fat is marketable for use in Grade AA butter (since it should be separated out before going into a cheese vat and picking up whey flavors). This part of the Class III formula is correct.