-Submission to 2017/18 DIRA review

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**Issue: Treatment of Lactose cost in Milk Price Manual**

**Background:**

I am a Fonterra supplier farming in Whakatane area. I was a former employee of Rangitaiki Plains Dairy Company (RPD) working in yield and loss monitoring and developing management systems needed to compare our performance against the New Zealand Dairy Board (NZDB) Cost Models. As such I have a good understanding of milk valuation methodology. I was there when RPD and Alpine Dairies introduced the current Milksolids payment model replacing a Milkfat based model. The rest of industry adopted the model the following season. NZDB developed valuation models for Milksolids. Milkfat derived value from Cream products. However NZDB used Protein as a proxy for value derived from Skimmilk (Solids not Fat). Further, milk testing technology could only test for Fat and Protein and not Lactose. This has been part of the reasoning preventing Lactose from being included in Milk payments. Once I left the factory and commenced dairy farming it became very apparent that the Milksolids model did not fairly distribute participation value of members especially considering the impact of CODEX manufacturing rules changed in 1996.

**Submission:**

1. For many years I have asked Fonterra to consider the inclusion of a Lactose payment in the Farmgate Milk Payout. Confidentiality precludes full disclosure of my discussions with Fonterra and their rationale not to have a Lactose component in their payment model. I believe I can disclose that Fonterra has a forward looking view that diverting of feed energy from producing Milksolids (Fat & Protein) to Lactose would reduce Milksolids production over time and reduce farmer productivity. It is not based on fairness of milk value at the Farmgate.

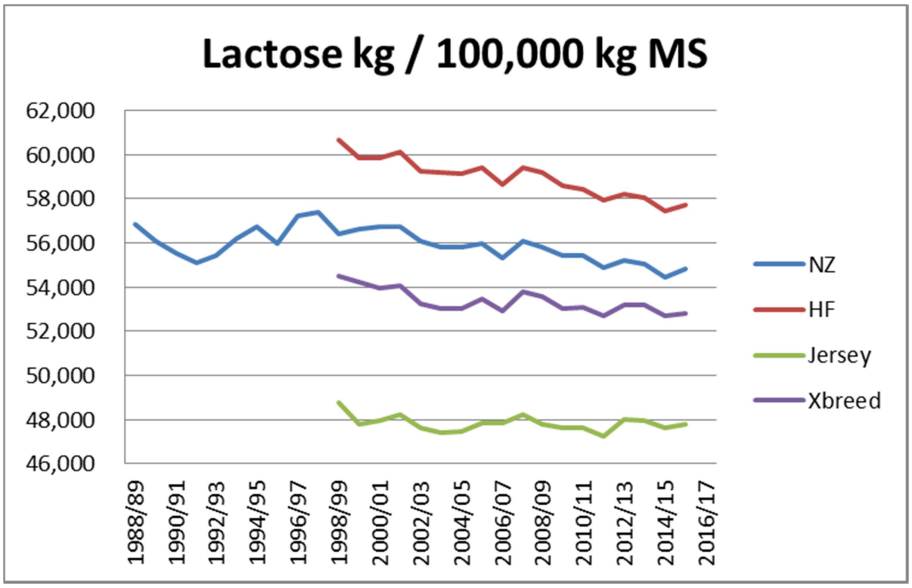
2. Of all the major components of milk (Fat, Protein, Lactose and Minerals) the Milk Price manual focusses an enormous amount of attention on the role that Lactose has in the optimisation of product yield within the basket of Commodity Products (WMP, SMP, Butter, AMF & BMP). The ability to use Lactose in this way arose out of changes to the CODEX rules around powder manufacture in 1996. The changes in CODEX rules came about many years after the current Farm Gate payment model was developed.

3. In 1980/1 the industry moved from a Milkfat only payment model to a Milksolids based model. It is usually described as A + B – C. (Milkfat payment + Protein payment – Volume Charge). Since then there has been a subtle change in the payment formula adopted only by Fonterra to A + B +/- C. Rather than deducting the full Volume Charge from each supplier Milksolids payment, it is ducted from Fonterra's Gross Milksolids payment yielding the commonly

excepted average Farmgate Milksolids price which is then adjusted by a supplier's variation in Volume requirements and more recently Capacity requirements.

4. The model places value only on Milksolids and continues to adjust value through Volume charges. Further, due to the high correlation between Lactose and Volume, non-payment for Lactose doubly penalises its production on farm (feed energy). The New Zealand Animal Evaluation Model, used to evaluate animal performance, interprets the Farmgate payment model literally and preferentially selects animals that produce more Milksolids with less Volume and Lactose.

5. The following chart demonstrates that the amount of Lactose being produced in comparison to Milksolids. Lactose supply will fall further unless selection pressure against Volume and Lactose is reduced. This could be through a Lactose payment or reduced Volume Charge.




6. The decline in Lactose supplied is about 206kg per 100,000kg Milksolids produced per year. Throughout New Zealand this represents a decline of about 3,800 tons annually. Also due to the increase in Protein content within Milksolids, the notional national requirement Lactose increases roughly by 6,700 if all Protein was converted to Milk powders. This is a real cost for additional ingredient Lactose. The cost and profit derived from this ingredient is socialised into the Protein payment.

7. A result of declining Lactose production there is an increase Milksolids concentration. Fonterra's response to this phenomenon has been to introduce a new measurement "Liquid Milk Equivalents". This new tool restates the volume of milk being produced in New Zealand. Last season's Milksolids concentration was 8.95%. If the average world's Milksolids concentration was 7.8%, Fonterra would restate the Litres processed up by +15%.

8. Lactose represents 35% of the solids produced on farm. It represents 39.8% of income derived from WMP and 53.0% of income from SMP (see typical compositions of these products).

**Milkfat Valuation:**

9. Farmgate Milkfat price has a good correlation derived products

   Butter contains 80.0% Milkfat, 1.5% Solids not Fat, 1.5% Salt

   The value of Milkfat 1.25 * Butter$

   (Per ton 1,000 kg Butter * Butter$ / 800 kg Milkfat = 125% Butter$ - costs).

   AMF contains 99.95% Milkfat.

   The Value of Milkfat is unity

   (Per ton 1,000 kg AMF * AMF$ / 999.5 kg Milkfat = 1.00 * AMF$ - costs).

**Protein Valuation:**

10. However the Farmgate Protein price is a proxy payment for Solids not Fat. This is a legacy of the payment model derived in 1980/1. Income from products using Solids not Fat is bundled together and denominated as a function of Protein. As such Protein has attracted a high Farmgate price typically 2-3 times the value of Milkfat.

    To illustrate:

    SMP contains 33.0% Protein, 1.0% Milkfat and 53.0% Lactose

    The value of Protein$ is 3.00 * SMP$

    (Per ton 1,000 kg SMP$ / 330 kg Protein = 3.00 * SMP$ - costs).

    WMP contains 26.5% Milkfat, 25.1% Protein 48.4% Lactose and Minerals

    The value if Milkfat$ is unity to WMP$

    (Per ton 265kg F * WMP$ / 265kg F = 1.00 * WMP$ - costs).

    The value of Protein is 2.93 * Solids not Fat

    (Per ton [251kg Protein + 484kg Lactose & Minerals] / 251kg P = 2.93 * WMP$ - costs).

**CODEX Lactose standardisation:**

11. It is not difficult to determine the amount of Lactose needed to produce CODEX Milk Powders. A simple method to determine Lactose requirement is the ratio of Lactose to Protein in finished product.

    WMP: 25.1% Protein, 39.8% Lactose = 1kg Protein: 1.6kg Lactose

    SMP: 33.0% Protein, 53% Lactose = 1kg Protein: 1.6kg Lactose.

| Fonterra Average 2001/02 | kg | WMP kg | Deficit |
|---|---|---|---|
| Protein: Fat Ratio | 0.7552 | | |
| Milksolids % | 8.46% | | |
| Milksolids | 100,000 | 88,453 | |
| Milkfat | 56,974 | 45,426 | |
| Protein | 43,026 | 43,026 | |
| Lactose | 56,383 | 68,842 | -12,459 |

| Fonterra Average 2016/17 | kg | WMP kg | Deficit |
|---|---|---|---|
| Protein: Fat Ratio | 0.7760 | | |
| Milksolids % | 8.95% | | |
| Milksolids | 100,000 | 89,824 | |
| Milkfat | 56,306 | 46,131 | |
| Protein | 43,694 | 43,694 | |
| Lactose | 53,296 | 69,910 | -16,614 |

The table highlights the change in Lactose requirement for WMP production between 2001/02 and 2016/17. There has been an average of 206 kg pa reduction in Lactose supply per 100,000 kg Milksolids supplied during the 15 years described above. Over this time there is an increased in Lactose demand of 277 kg pa (additional demand comes from more Protein).

12. The roll of Lactose in CODEX Milk Powder production is important in optimising the utilisation of Milksolids, especially Protein. It is an important element in adding value to Milksolids. Yet in the Milk Price Manual and Milk Price Statement Lactose is a cost of goods sold and not a manufacturing charge.

13. Ignoring Fonterra forward looking view regarding Lactose it is very clear that the requirement for Lactose for CODEX standardisation will increase. Therefore the role of purchased Lactose becomes increasingly important in developing rules over how it is represented in the Milk Price Manual and Milk Price Statement.

Farmgate Milk Price Summary (2016/17)

**TABLE 2: FARMGATE MILK PRICE SUMMARY**

| SEASON | 2017 NZD $ MILLION | 2017 $/kgMS | 2016 NZD $ MILLION | 2016 $/kgMS | 2015 NZD $ MILLION | 2015 $/kgMS | 2017/2016 % CHANGE ($/kgMS) | 2016/2015 % CHANGE ($/kgMS) |
|---|---|---|---|---|---|---|---|---|
| Farmgate Milk Price Revenue | 12,400 | 8.13 | 9,134 | 5.83 | 10,540 | 6.53 | 39.4% | –10.7% |
| Lactose | (415) | (0.27) | (302) | (0.19) | (603) | (0.37) | 41.3% | –48.4% |
| **Net Revenue** | **11,985** | **7.86** | **8,832** | **5.64** | **9,937** | **6.16** | 39.3% | –8.4% |
| Farmgate Milk Price Cash Costs | (1,763) | (1.16) | (1,815) | (1.16) | (1,889) | (1.17) | –0.3% | –1.0% |
| Farmgate Milk Price Capital Costs[1] | (873) | (0.57) | (915) | (0.58) | (952) | (0.59) | –2.1% | –0.9% |
| **Total Costs** | **(2,636)** | **(1.73)** | **(2,731)** | **(1.74)** | **(2,841)** | **(1.76)** | **–0.9%** | **–1.0%** |
| Farmgate Milk Price | 9,349 | 6.13 | 6,101 | 3.90 | 7,096 | 4.40 | 57.3% | –11.4% |
| Million kgMS | | 1,526 | | 1,566 | | 1,614 | –2.6% | –3.0% |

**FIGURE 1: CHANGES IN THE FARMGATE MILK PRICE SEASONS: 2015–2017**


14. Lactose is both a Milk Solid and an ingredient. Its treatment in the Milk Price Manual is subtly different between these two rolls.

15. In Milksolids supply it appears to be free and forms part of the residual socialised Farmgate Milk price after costs are deducted from Revenue.

16. As an added ingredient it has been treated as a cost of goods sold not a manufacturing charge. It is not clear as to why Lactose ingredient is treated this way when other ingredient costs, such as salt for butter, are included Cash Costs. From the above table, Lactose is deducted at $0.27c/kg Milksolids and represents 3.3% of the $8.13c/kg Farmgate Milk Price Revenue.

17. The discussion this year in selecting GDT prices or lowest imported price is less important than recognising the huge value Lactose adds to payout.

18. The Milk Price Statement is constructed to reflect that Fonterra is a co-operative. It does this in two subtle ways:
    1. The return on Investment WACC (Weighted Average Cost of Capital) is buried in the Capital Costs of manufacture. Fonterra derives a capital return on investment that is deducted from Net Revenue.
    2. The cost of Milksolids is moved from Manufacturing Costs to be the residual members receive as the Farmgate Milk Price. The net effect of this is that Fonterra makes no profit by maximising members Milksolids return.

19. If Lactose was no longer a Cost of Goods Sold but is an ingredient cost, Fonterra would need to recognise the value of Lactose buried in the current Milksolids supply. The reasons for excluding Lactose Farmgate payments have long since been dispelled. Fonterra continues to invest significant capital into processes that prevent Lactose losses to the environment or to low value co-products (ethanol) and recovers it into Milk Powders where it generates identical returns as Milksolids in those products. Nearly 2/3 of the Lactose requirement stated in the Milk Price Statement actually comes from New Zealand milk and is extracted from milk, either as milk permeates extracted from milk used for Cheese or Casein making or purified into a powder from residual whey.

20. Logically, the cost of Lactose from New Zealand milk needs to be lower than the cost of imported supply. Therefore the use of GDT prices or lowest alternate supply diverts the Commission's attention from the true cost of Lactose to Fonterra. Fonterra's notional and real competitors can obtain Milk Permeate from New Zealand supply. Synlait obtains milk permeate from Westland Milk Products.

**Lactose in Milksolids Supply**

21. Currently Lactose is excluded from Milksolids payments separately. As explained above it is blended into the Protein payment. Lactose has a direct effect on volume which is reflected in Farmgate Payout.

22. It is accepted that there is a direct correlation between Lactose produced and milk volume. If more Lactose is produced then there is more volume. In an unbalanced calculation, members are penalised for supply extra volume for the same quantity of Milksolids supplied and not rewarded for the extra revenue that Lactose creates.

23. The high value of Protein (which includes Lactose value) has led to increased supply of Protein in relation to Milkfat in Milksolids supply. This is commonly identified as an increase in the Protein to Fat ratio (Fonterra calls this "Component Composition Ratio"). Generally, chasing Protein drives additional Lactose production. The rate of Lactose increase though has slowed and is about 40% less than in 2001/2.

24. The substitution of 1 kg of Milkfat with 1 kg of Protein in Milksolids supply changes Milksolids value slightly.
    But the impact of Lactose in Milksolids supply is greater:
    1 kg of Lactose equals 21.3 Litres of volume
    21.3 Litres incurs a $0.88c additional Volume charge ($0.0415c/L)
    1 kg Lactose in Milksolids supply displaces the requirement of 1 kg ingredient Lactose
    1 kg Lactose incorporated into milk powders generates 1 kg Milk Powder revenue
    (At the time of writing from NZAgri report 10 November 2017 and GDT website)
    Exchange rate 0.6960 US$/NZ$
    Lactose $US 760/t = $NZ 1,090/t (average last 3 GDT results)
    WMP = $US 2,900/t = $NZ 4,170/t
    SMP = $US 1,820/t = $NZ 2,620/t
    We are at historically low prices for SMP. Historic prices for WMP, SMP and Lactose have been much higher yielding greater margins than expressed below.

25. From each of the values above, Lactose in milk supply generates a higher return than ingredient Lactose, but this benefit is socialised into the Milksolids payout. I have not included the additional benefit of milk minerals available in raw milk and milk permeate but are absent in Lactose powder.

26. The value of Lactose in Milksolids supply is ignored in the Milk Price Manual simply because it reports the average position and the Lactose variation in supply is not expressed.

| | Value $NZ | 1 kg Lactose equivalence | Margin above cost / kg |
|---|---|---|---|
| Volume Charge | 0.0415 | 0.88 | -0.88 |
| Lactose | 1,090 | 1.09 | 0.21 |
| WMP | 4,170 | 4.17 | 3.29 |
| SMP | 2,620 | 2.62 | 1.74 |

27. The Milk Price Manual and the Milk Price Statement are artefacts of an obsolete Milksolids based payout paradigm. Since 1996 when the CODEX rules allowing Lactose to be incorporated into Milk Powders, Lactose should have been incorporated into the Farmgate Milk Price model.

28. I am cognisant of the upheaval that occurred in 1980/1 when the current Milksolids model replaced the Milkfat based model. When the change occurred there was distrust through the redistribution of payout value from Fat rich supply to Protein rich supply.

29. Today, Lactose rich Milksolids supply is being significantly penalised by Lactose poor Milksolids supply.
    This extends to how:
    Volume charges are calculated.
    Members Capital shareholding in Fonterra
    The lost revenue derived from Lactose in products currently blended into the Protein payment

30. The Milk Price Manual is required to demonstrate that the Milksolids price that it calculates is current and fairly reflects the price a competitor could or should pay for milk.

**Fonterra's Farmgate Milk Price should not be the Milk Price Statement value:**

31. The Milk Price Manual is required to determine the price a Notional Competitor would or should pay for milk. Within New Zealand there is no manufacturer who has the scale and capacity of Fonterra and yet it is Fonterra's costs that are being used to determine the milk price. This is acknowledged through Fonterra using the Milk Price Statement as the pricing mechanism for Fonterra Milksolids payments.

32. Fonterra has hijacked the model by using it to value its own milk supply and justify value add and dividend yield. Fonterra's scale and use of its own costs allows it to maximise the potential Farmgate milk price. I accept that Fonterra members should not allow milk to be sold to competitors at a price discounted to their own. And it is pleasing to note that the DIRA milk requirement in New Zealand is reducing. I welcome the oversight of the Commission to protect the New Zealand interest in DIRA milk supply. I believe that Fonterra needs to demonstrate to its own members how our investment in plant and over capacity is delivering more than the notional competitor. Further, for the small amount of milk that Fonterra supplies to new entrants and non-enduring (unavailable after 3 years) should be negotiated bearing in mind the Milk Price Manual result.

**Conclusion:**

33. In New Zealand the notional competitor are actually real Companies owning and operating factories throughout New Zealand. If our investment in Fonterra has delivered significant gains from scale, optionality (ability to optimise product mix) and value add we should consistently see Fonterra top of the payout heap. It is not.

    Lactose has significant value at the Farmgate and this is not acknowledged in the Farmgate Milk Payment. Changes have to be made to the Milk Price Manual that correctly values Lactose as an ingredient, either bought in as a powder or part of the milk supply. It is not a "Cost of Goods" above the Revenue line.

    The Commission needs to challenge Fonterra in how it treats Lactose within the model and in its real world.