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Public version

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Dear David and Hamish

Cavalier Wool Holdings – Y Benefits

In Cavalier Wool Holding's (**CWH**) application for clearance, CWH presented evidence that it had achieved an increase in the base Y value of the clean wools it was scouring through the modifications it has made to its scour lines, changes designed to increase the throughput and capacity of those scour lines.

No evidentiary basis for views expressed by third parties

CWH believes most (if not all) of the submissions made by interested parties in relation to the base Y benefit appear to be designed to confuse the issues, rather than to enlighten the Commission and assist it in its analysis. This is apparent from the fact that no substantive evidence has been presented to corroborate the great majority of the assertions put forward.

Despite the lack of evidentiary basis for these assertions, in order to assist the Commission's analysis, this letter and the detailed Annexure provides CWH's response to the assertions made by interested parties, and provides substantive evidence that:

- a base Y benefit can be expected to result; and
- the opposing assertions made by interested parties have no foundation and should not be accepted.

The detail of CWH's response is contained in the attached Annexure, while the remainder of this letter provides a high level overview of that response.

Independent expert evidence supports CWH's submissions

As part of its response to the assertions made, CWH is submitting with this letter two independent expert reports in relation to the base Y benefit claimed:

- The first is from Mr Stephen Fookes, who was the Chief Executive Officer of the New Zealand Wool Testing Authority (**NZWTA**) from its inception in 1978 through to 2008. During this time Mr Fookes played an influential role in establishing an objective global measurement for base Y value and the development of IWTO 56 – the globally accepted objective test of base Y.

- The second is from Mr Steve Ranford, a scientist with 30 years experience specialising in research surrounding wool properties and scouring techniques.

Both these experts are independent and CWH has no past or ongoing involvement in their businesses and both have agreed to comply with the Code of Conduct for Expert Witnesses contained in the High Court Rules. Both explain that base Y is an objectively verifiable measure of wool colour and each of them has independently concluded that:

- base Y can be increased through the scouring process (other than by the addition of peroxide bleach);
- the evidence presented by CWH indicates that CWH has achieved the claimed increase in base Y value;
- an increase in base Y has a significant value; and
- merchants/exporters etc would be able to procure greasy wool with a lower base Y value without degrading all or any of the other properties of the greasy wool they acquire.

Notwithstanding the evidence provided by these two senior experts, CWH believes that the most qualified "expert" on these matters is its CEO, Mr Nigel Hales. Mr Hales is a world renowned expert in scouring as well as a wool grower himself. He has worked for or advised scour operators and Governments around the world. His opinion – backed by his commercial experience – is that CWH's base Y has increased as a result of the mechanical changes developed by CWH.

Base Y has a value

There seems no debate amongst the experts called to give their opinions that base Y has a value. WSI's expert describes 4/c per kg as a "conservative" figure. This is towards the middle to high end of the range identified in NERA's report. The valuation of this benefit has to date focussed on merchants/exporters decreasing the base Y of the greasy wool they acquire. The benefit can alternatively be conceptualised as:

- Enabling merchants/exporters to achieve a higher base Y value for their scoured wool based on the same input greasy wool. Since base Y has a value, merchants/exporters could sell this higher base Y value wool at a premium to today's prices. The benefit is the mirror image of the benefit as it is currently espoused in the application.
- Enabling merchants/exporters to use the same greasy input wool and to achieve the same clean output wool but doing so using less bleach than is currently the case. A significant proportion of New Zealand's wool has some bleach added during scouring. Reduction in bleach is a cost saving both directly and indirectly as bleach harms fibre and results in later processing losses. This value has been quantified by NERA as is detailed in the Annexure.

CWH has achieved an increase in base Y

While Dr Carnaby implies that the trend lines shown may be due to sampling errors or imprecision, the evidence presented by CWH shows that this is not correct:

- As Mr Fookes and Mr Ranford each explain in their evidence, Dr Carnaby has misunderstood and misapplied the "precision" parameter in the base Y test.
- In any event, a statistical analysis of the trend line shows:
    - the upward trend in CWH's clean base Y value is statistically significant (i.e., there is a genuine trend upwards);

- the North Island greasy base Y trend is not statistically significantly different from zero (i.e., there is no evidence of a change in greasy wool base Y); and

- the difference between the two lines is statistically significant (i.e., the levels of the lines are distinct, and they are diverging).

Only explanation for CWH's increased base Y is its scouring line modifications

The only changes which can explain this statistically significant trend are the modifications CWH has made to its scour lines.

Mr Fookes and Mr Ranford both state that in their opinion the mechanical changes in the scour lines are the likely cause of the statistically significant upward trend in base Y that has been achieved.

While Dr Carnaby implies that there might be other reasons for this trend, he presents no evidence to demonstrate that any of these reasons are a likely justification. CWH presents evidence in this submission which demonstrates that Dr Carnaby's reasons are contrary to the facts.

In fact, not only does Dr Carnaby provide no evidence for an alternative explanation for the base Y increase, he actually provides a very cogent and reasoned argument for why the CWH modifications do explain the increase in base Y that CWH has achieved.

Relevance of "as is" Y

Dr Carnaby appears to imply that CWH has mistaken an increase in "as is" Y as being an increase in base Y. This implication is without any foundation. First, "as is Y", as a matter of fact, cannot exceed base Y. Secondly, in CWH's view, it is a particularly illogical assertion given that the data presented by CWH is based solely on base Y improvements and is sourced from an independent wool test house. Each data point is representative of an underlying independent test certificate which records the base Y for the sample under test.

Evidence demonstrates customers can procure greasy wool with a lower base Y while maintaining the other properties

Mr Fookes and Mr Ranford both confirm that customers can reduce the base Y value of the greasy wool they procure without "dumbing down" all the other properties of the wool. It is of interest that Dr Carnaby has not sought to promote or support this issue.

Mr Fookes' and Mr Ranford's opinions are supported by the evidence, including:

- **[ ]**;

- the reality that end-users separately specify a base Y value – there would be no use in doing this if base Y did not have a demonstrably separate value; and

- the econometric studies which would not be able to isolate a value for base Y in the presence of correlation.

Benefit to New Zealand

The benefits of the base Y increase will flow to New Zealand. NERA have explained why they disagree with the proposition that the incidence of the quality benefit will be primarily to foreigners. They express the opinion that relatively little of this benefit will flow to foreigners in the early years of their analysis, although they acknowledge that over time some of the benefit will be distributed to overseas consumers.

Base Y improvements will not arise in the counterfactual

WSI has not implemented the modifications which might result in the by-product of an increase in base Y. This is despite rebuilding its Whakatu scour line in 2006.

CWH was incentivised to make its modifications (and will be incentivised to make the further improvements to Awatoto and the WSI scour lines) by its need to increase its throughput and capacity. Correspondingly, and as a by-product, its base Y has increased.

WSI has no need for additional capacity, particularly in a declining wool environment, and has neither the capital nor the specific knowhow to make the necessary adjustments. The changes, while they may sound simple, are not "off the shelf" improvements that can simply be brought. They reflect the experience, knowledge and intellectual capital of CWH management.

There is no real chance that WSI will achieve the same outcome in the counterfactual.

Structure of Annexure A

Annexure A provides CWH's detailed reasons and the supporting evidence. It is structured as follows:

- Section 1 responds to Dr Carnaby's report and demonstrates that the data presented does in fact show an increase in base Y. It explains the reasons why the CWH modifications are the only plausible explanation for this increase and provides further evidence to support this.

- Section 2 responds to the assertion that the Y value of greasy wool is correlated with other wool values and provides alternative ways for conceptualising and valuing the base Y benefit.

- Section 3 reiterates why the conditions necessary for an increase in base Y for WSI wool cannot be expected to arise in the counterfactual.

Please let us know if you have any questions in relation to this letter and the Annexure.

Yours sincerely

[Sgd: Phil Taylor / David Blacktop]

Phil Taylor / David Blacktop
Partner / Senior Associate

Annexure: detailed response to points raised

1. Dr Carnaby's report

1.1 *The basis of Dr Carnaby's report*

Dr Carnaby was asked by WSI's commercial legal advisor to provide "an independent expert review" and states in his report that "the views I express below are my own views as an independent expert in this field".

CWH does not believe Dr Carnaby is an "independent" expert. This is because CWH understands that Dr Carnaby is, and has been for some time, a contractor and consultant to WSI. CWH understands that Dr Carnaby consults for WSI on a range of matters including effluent treatment (a role that would no longer be required if the Kaputone plant was closed, as is planned if CWH acquires WSI) and strategy issues such as the recent WPC/WPI initiative.[1]

It is also relevant that Dr Carnaby is neither an expert in wool testing processes nor an expert in wool scouring.

These factors should be borne in mind when considering the weight to be applied to Dr Carnaby's report and his findings.

1.2 *Dr Carnaby accepts base Y has a value*

Dr Carnaby states that in his opinion:

> … a long term average value of 4c/kg per unit increase in base Y is a conservative figure and could be used to reliably calculate economic value.
>
> I consider that the arguments presented in sections 18.31 to 18.37 of the Cavalier application relating to the economic value of Y, should improvements be achieved, may be broadly accepted.

Mr Ranford and Mr Fookes agree that this 4c per kg figure is "conservative". Mr Ranford's opinion is that the actual figure should change in line with the market. Mr Fookes states that his experience is that the requirement to differentiate wools for brightness has increased as wool manufacturers seek to compete with synthetics, such that the price premiums previously estimated will at least have been maintained.

It follows that WSI's expert accepts that if CWH's modifications have caused a base Y improvement, and should these improvements be applied to the WSI volumes, the benefits claimed by CWH will arise. Indeed, Dr Carnaby's 4 cents per kg figure is towards the middle to higher end of the value range used by NERA to calculate the quality benefits (NERA used 1.9-4.2 cents per kg greasy).

1.3 *Primary difference is whether there is evidence CWH has improved base Y*

The primary difference between Dr Carnaby's view and the views of CWH (and Mr Fookes and Mr Ranford) is whether CWH has achieved an improvement in base Y.

CWH believes that the data CWH has produced shows CWH has achieved a real increase in base Y value. CWH's Chief Executive, Nigel Hales, is himself a world renowned scouring

[1] See, for example, see *Todd Pohokura Limited v Shell Exploration NZ Limited & Another* (Unreported), High Court, Wellington 19 August 2009, Dobson J where the closeness of an "expert's" connection to a company (a former long standing but retired executive) took him outside the range of "independent experts".

expert who advises or has worked for scour operators around the world and his opinion (and commercial judgement) is that the scour line modifications CWH has made have not only achieved their primary objective of increasing throughput but have also resulted in the uplift in base Y.

That belief is supported by the independent expert opinions of Mr Fookes and Mr Ranford.

In contrast, Dr Carnaby concludes that the data only shows a "*possible*" real improvement in base Y value. Even if the base Y value has improved, Dr Carnaby believes this improvement is for reasons other than the modifications CWH has made. However, as explained in the sections which follow:

- the reasons advanced by Dr Carnaby for why the data shows only a "*possible*" improvement in base Y are without an evidentiary foundation – moreover there is evidence which contradicts the assertions made; and

- Dr Carnaby provides a rational and reasoned explanation for why CWH would have achieved the base Y uplift through the modifications it has made to its scour lines.

Importantly, neither Dr Carnaby nor WSI have provided any evidence to demonstrate that WSI have achieved the same base Y value uplift through their own scour line modifications. WSI has, or should have, its own clean wool statistics and peroxide use figures, yet has apparently chosen not to provide these to the Commission. The Commission should draw the obvious inference from this failure to produce relevant evidence.

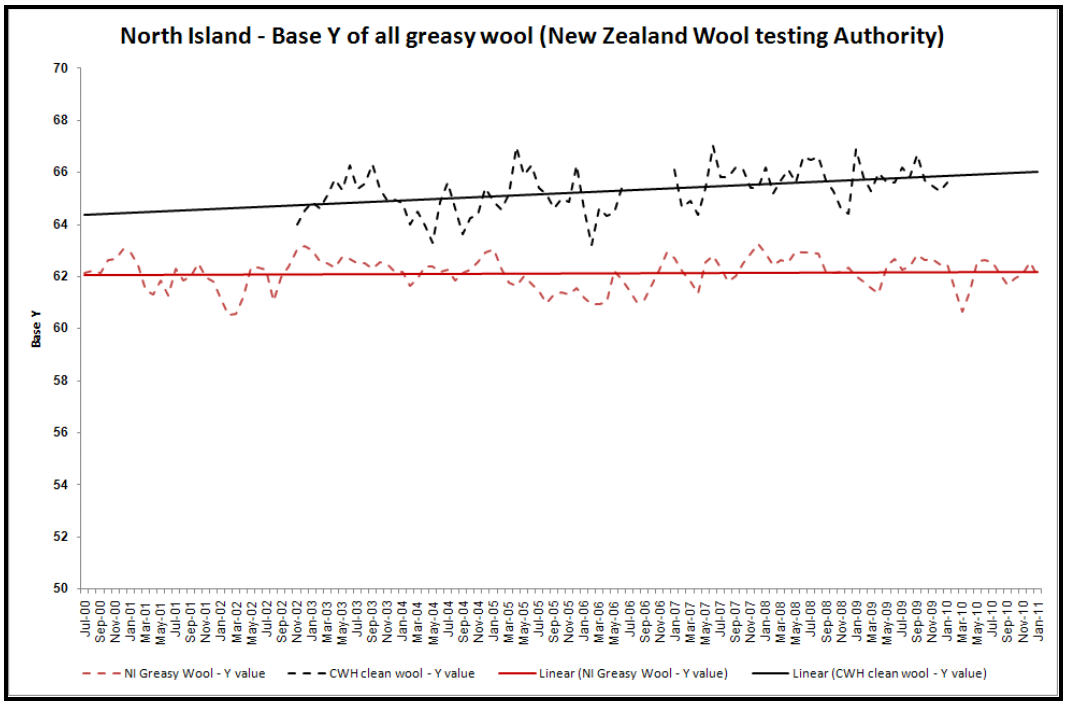
1.4 *Data shows improvement in base Y value*

CWH considers that the mechanical modifications it has made (and post transaction is incentivised to make) to its plants have had the effect of increasing the base Y value of scoured wool holding all other parameters constant.

The evidence CWH has achieved these improvements is depicted in Figures 6 and 7 from the Application, which are reproduced below. This data is based on an established, global, robust and objective measurement, conducted by an independent testing institution, which itself undergoes quality testing.[2]

[2] Mr Fookes explains in his evidence how the world's wool testing authorities ensure that their testing processes are robust by participating in round group trials on a twice weekly basis.

Figure 1: Consolidated version of Figures 6 and 7 from the authorisation application



As can be seen, the trend line for the base Y value of all North Island wools has a slope of close to zero. The trend line for CWH base Y value is upward sloping.

Dr Carnaby acknowledges that "it is possible that a small real improvement of say 0.8 of a unit of Y has been achieved".[3]

In fact, not only is it "*possible*" that this improvement has been achieved, it is conclusively illustrated by the data. NERA has conducted a statistical analysis of the trend lines and conclude the following[4]:

- The **upward slope** of the CWH trend line (the black line) **is statistically significant**, i.e., this is statistical evidence of a positive increase in CWH's clean base Y over the period. In broad terms this means that if one took a re-sample of CWH's monthly average base Y values over the period shown in the graph, then in 95% of cases the CWH trend line would slope upwards.

- The slope of the North Island trend line (the red line) **is not statistically significantly different from zero**, i.e., there is no statistical evidence that the base Y value of greasy input wool has increased over the period. That is, a re-sample of these monthly average base Y values would show that in 95% of cases the trend line is flat.

[3] Dr Carnaby in contrast refers to a 0.8 base Y unit uplift. He calculates this uplift based on the fact that at the start of the series the difference between the two series was 2.7 units and at the end it is 3.5 units.

What this overlooks is that the initial 2.7 base Y unit increase was achieved through the use of peroxide bleach. While Dr Carnaby agrees that use of bleach can increase the base Y of greasy wool, and agrees that the uplift in CWH's base Y value from 2.7 to 3.5 cannot be attributed to increased bleach use, he has overlooked the fact that CWH's bleach use has in fact declined over the period.

In other words the initial 2.7 base Y unit uplift would be lower today than it was at the start of the period. It is for this reason that CWH says that it has achieved a 1 unit base Y increase.

[4] At the 95% confidence interval.

- The difference between the levels of the two trend lines **is statistically significant** i.e., there is statistical evidence that the difference is not due to sampling error. That is, the level of the CWH trend line (as measured by where it intercepts the y-axis) is greater than the level of the North Island trend line, and this difference would be expected in 95% of cases if the monthly average Y values were re-sampled.

- The difference in the average (mean) of the CWH base Y series and the North Island greasy wool base Y series **is statistically significant**, i.e., there is statistical evidence that the mean CWH base Y value over the time period is higher than the mean North Island greasy base Y value.

1.5 ***No valid reason for discarding the trends shown***

Dr Carnaby's reasons for describing the improvement shown in the data as only "possible" are without foundation.

(a) *The data is not "imprecise" – the trends are statistically significant*

Dr Carnaby suggests that the trend line is not valid because the tests underlying the samples have "an imprecision of 3 units".

As explained in the statements of Mr Fookes and Mr Ranford, this is an incorrect characterisation of the testing procedure.

It is also an incorrect characterisation of the evidence presented. Figure 1 above shows a trend. As Mr Ranford points out:

> Trend analysis carried out on a large database covering a number of years is acknowledged as a very powerful statistical technique and is often used to analyse quality parameters. The trend analysis contained in the CWH submission compares scoured wool base colour for the Awatoto plant to greasy wool base colour for the North Island over an 8 to 10 year period.

To similar effect, Mr Fookes states:

> I understand that the data presented is based on tests on commercial deliveries. The effect of combining some thousands of tests into the data presented would mean the trends would have very high precision, and accuracy, and be without any significant bias.

Accordingly, Dr Carnaby's inference that because the 1 unit of base Y increase in CWH clean wool trend line and 0.2 unit of base Y increase in other North Island wool line are within a range of +/- 3 units the difference is due only to variation from sampling and/or testing errors, rather than any real (and statistically significant) difference in base Y values, is false.

As shown above, there is statistical evidence that these trend lines are diverging.

(b) *Other factors affecting wool colour*

Dr Carnaby suggests that the upward base Y trend may be explained by changes in the "use of acid or processing conditions of time and temperature during scouring and drying". Dr Carnaby has presented no substantive evidence to support that this is the case.

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Specifically:

- In relation to acid use, Dr Carnaby correctly notes that acid use does not affect base Y measurements (unless iron staining is reduced by the use of acid). In any event, CWH has not changed its use of acid during the period.

- In terms of time of processing, CWH has continued to operate 24 hours per day.

- In terms of temperature during scouring and drying, **[ ]** and nor is CWH aware of any evidence that weather conditions in the Hawkes Bay have systemically changed over the entire 10 year period in a way which would invalidate the trends shown.

(c) *Different wool populations*

While Dr Carnaby claims that the trend is invalid because the CWH trend line is from a wool population that is a sub-set of the North Island line, CWH's view is that rather than this being a reason to discard the trend, this is the very fact which makes the trend line a robust measure of changes in base Y values.

As an initial point, Dr Carnaby starts his analysis by claiming that the 2.7 base Y unit between the two trend lines at the start of the period "implies that [CWH] uses an above average subset of the NI production". This is not correct. The 2.7 units simply reflects the use of peroxide bleach which will increase base Y. Accordingly, it provides no evidence that CWH's customers were buying "above average base Y value" greasy wool at the start of the period.

In any event, the initial starting point provides no basis for a claim that the subsequent increase in CWH's base Y value reflects "the progressive purchase of a slightly whiter subset of North Island wools over that 10 year period".

No substantive evidence is provided for this proposition and there are strong reasons why this is highly unlikely to have occurred. (In fact, if anything, the base Y value of the greasy wool scoured by CWH has decreased.)

- The first reason is driven by the nature of the commission scouring model. As Mr Ranford explains:

  > ...the commission scouring model attracts a wide range of North Island produced strong and mid micron wool types for processing and is likely to converge on the average greasy base Y results as shown for the North Island, although this requires verification.

  Accordingly, Mr Ranford concludes:

  > ...in my opinion it is unlikely that greasy wool procurement strategies alone account for the observed trends in base Y over time given the scour operates on a commission basis with a wide range of strong and mid micron wool types being processed through the plant.

- Secondly, as CWH scours the majority of wools in the North Island and has done so over the relevant period, a finding that its customers have increased their purchase of higher base Y value wools implies that all other customers have been buying much lower quality base Y value wool. There is no evidence from WSI or Dr Carnaby to suggest this is the case.

- Thirdly, CWH is not aware that end-use customers have increased the base Y value of the wool they have been acquiring over the last ten years. As an example, **[ ]**

(d) *Analysis of individual scourments shows demonstrable improvements*

If Dr Carnaby's assertions were correct, and the change in base Y was due to changes in wool procurement practices or sampling errors, then evidence of this should appear in an analysis of individual scourments. Specifically, the greasy base Y and clean base Y of individual scourments should be the same.

Accordingly, CWH examined a small sample of individual scourments from the last two years at each of its Awatoto and Timaru scour lines to illustrate the base Y improvements that have been achieved.

To conclusively isolate base Y changes achieved *only* through its scouring process, CWH sampled only those scourments where the customer directed that zero bleach be added.[5] There could then be no suggestion that bleach altered the base Y value.

CWH examined 10 individual scourments across a range of wool types (excluding merino).[6]

Figures 2 and 3 below show for each individual scourment the base Y measurement as reported by NZWTA of the wool in the scourment in its greasy form (i.e., before it goes into the scour line) and the base Y measurement of the clean wool (i.e., that same scourment after it comes out of CWH's scour lines).

The figures demonstrate that CWH's scouring process increases the base Y of the wool.

[5] **[**

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[6] CWH estimates that **[ ]**% of its non-merino volumes are scourments where the customer specifies no bleach.

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Figures 2 and 3 provide evidence that base Y value uplifts are being achieved through scouring only, although given the small sample sizes, it is not possible to draw an accurate average from these samples.

1.6 ***Increase in Y value caused by CWH modifications***

(a) *Evidence that the modifications have caused the base Y uplift*

The analysis presented in sections 1.4 and 1.5 shows that CWH has achieved an improvement in the base Y of the wools they scour. There also seems to be no dispute that CWH has developed its scour lines to a greater degree than WSI. Certainly, WSI have not presented evidence to dispute this.

Accordingly, the only explanation for the change in CWH's base Y is the scour line improvements it has made. This view is confirmed by Mr Fookes and Mr Ranford:

Mr Fookes states:

> Assuming that the range of wools was similar continuously through CWH's scour over the period, then this would indicate that there was a significant improvement in the process to achieve a higher Base Y value. I understand from CWH that the range and quality (including Base Y value) of greasy wools has not increased over the period;
>
> Furthermore, the fact that the use of the standard bleach, hydrogen peroxide, remained constant assists the conclusion that an effect other than hydrogen peroxide had caused the Base Y value to improve.

Similarly, Mr Ranford states:

> ...in my opinion the likely explanations for the changes in CWH's clean base Y as indicated in Figures 6, 7 and 8 of the CWH application are the modifications made to the scour plant, which includes chemical engineering practices combined with practices for machining the wool specifically aimed at dirt management in the scour.

(b) *Dr Carnaby's evidence*

Dr Carnaby asserts that the changes CWH has made to its scour lines:

> …all appear to fall into the category of more vigorous agitation, cleaner wash liquors or better rinsing.

He consequently expresses his view that:

> …there is no reason to expect that any of these steps would be likely to greatly improve the base colour of the fibres as this is always measured only after the even more vigorous agitation and cleaning which occurs during sample preparation for the colour test IWTO 56.

This statement is illogical because as shown above, there is clear evidence that CWH has improved the base Y value of its scoured wools in circumstances where the only explanation for what has changed is the additional modifications CWH has made to its scour lines.

What makes Dr Carnaby's statement even more illogical is that Dr Carnaby then goes on to provide a very cogent explanation for CWH's base Y improvement.

Dr Carnaby explains that:

- "***Staining of the fibre with iron ions sourced from soil particles depresses the Y value***".

  CWH agrees.

- "***Ion staining is not reversed by the cleaning steps used in the colour test IWTO 56***".

  CWH agrees. The result is that scoured wool with less iron ion staining than can be achieved through IWTO 56 will show a higher base Y value than IWTO 56. Similarly, if the amount of iron ion staining is reduced over time, the improvement in base Y over and above the IWTO 56 standard will improve.

- "***It is possible that extra mechanical action prior to wetting may reduce the amount of iron staining and consequent dulling of the wool by removing more soil before wetting the wool***".

  CWH agrees, **[**

  ].

- "***It is possible that the new processes introduced by Cavalier have reduced the amount of iron staining and consequent dulling of the wool by removing more soil before wetting the wool***".

  CWH agrees, but says that it is more than "possible" – this is the variable which can explain the long term and demonstrable trend.

CWH largely agrees with Dr Carnaby's statements and believes that they neatly explain the impact of the changes CWH has made to its scour lines.

Iron ion staining occurs in Bowl 1 of the scouring process. This is where the detergent is added to the wool in order to wash out residual extraneous matter (i.e., dirt and wool grease). Iron ion staining occurs when the solids (i.e., dirt) in Bowl 1 become oxidised (i.e., starved of oxygen) and reattach to the wool fibre. Once they have oxidised and reattached to the fibre they cannot be removed through any process other than bleaching.

It follows that anything which reduces the level of solids in Bowl 1 will reduce the potential for this to occur. The modifications CWH has made have **[**

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As outlined in paragraph 18.41 of the Application, the changes include:

- increasing the number of openers on the scour line well above the industry norm; and

- **[**

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(i) Additional opening prior to Bowl 1 – removing additional dirt

As will be obvious from the discussion above, in simple terms, **[**

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[**]** (i.e., "dirt") prior to the wool becoming wet in Bowl 1 and this is the purpose of the additional openers. The additional opening equipment includes:

- **[** **]** at Timaru and **[** **]**. In contrast, Kaputone and Whakatu have only 1 triple drum and 1 double drum opener each;
- **[** **]** short wool processor per line – Timaru and Awatoto have **[** **]**, while Kaputone and Whakatu have only 2. Furthermore, CWH has **[**

]; and

- **[** **]** decotters per scour line – CWH operates **[** **]**, whereas WSI has only 1.

(ii) Modifications to Bowl 1

The importance of removing dirt does not end when wool enters Bowl 1. While dirt that is not removed by openers can be washed out with detergent in Bowl 1, this "washed out" dirt flows into the liquor contained in Bowl 1. The greater the amount of dirt that remains in this liquor, the greater the iron ion staining that will occur.

Obviously, the more dirt that is removed prior to Bowl 1, the lower the amount of dirt that will remain in the wool.

However, conversely, **[**

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Dirt loops **[**

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CWH has also modified [
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- [ ]
- [
]
- [
].

CWH has modified [

]. To illustrate the difference:

- the 3.0m Timaru line [

]
- the 2.4m Awatoto lines [

]

[

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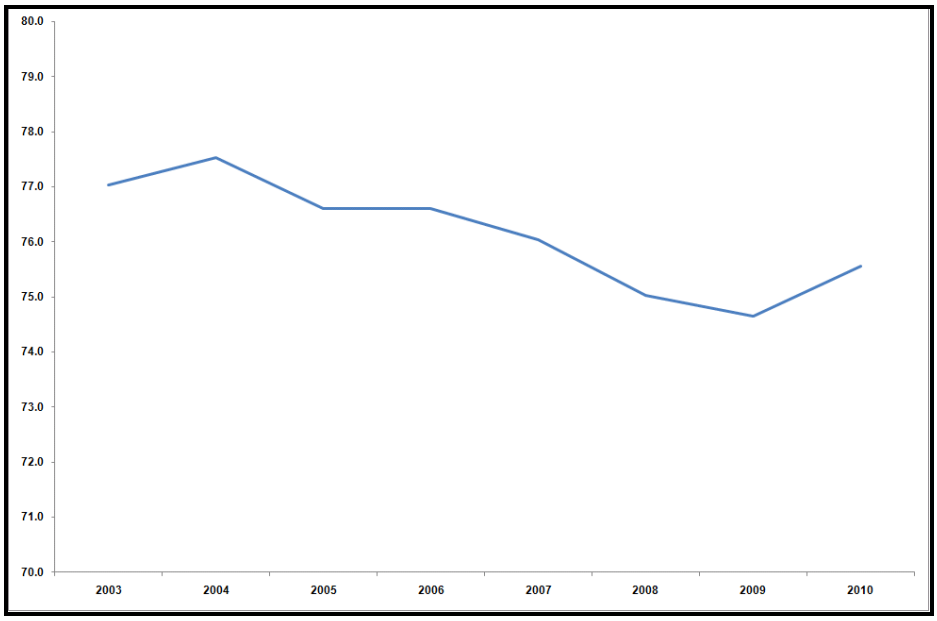
(iii) Amount of "dirt" in North Island wools has increased

CWH anticipates that it may be suggested that the increase in Y just reflects a reduction in the level of extraneous matter in greasy wool over the last 10 years, rather than that extraneous material being removed by CWH's scour line improvements.

In fact, data from NZWTA shows that the level of extraneous material in North Island greasy wool has *increased* rather than decreased.

This is indicated in Figure 4 below which shows the yield for North Island wools. Yield is the amount of wool fibre per kg of greasy wool; the balance of the weight comprises extraneous materials. The higher the yield % is, the lower the extraneous material.

Figure 2: North Island yield - 2003 to 2010



2. Correlation of base Y with other value parameters

2.1 *Evidence suggests base Y has a separable value*

The Commission has been advised by other parties that a lower greasy base Y value carries with it a degradation of all the other properties of a greasy fleece and, therefore, reductions in the blend for scouring by using a lower greasy base Y is not possible because the lower related properties are detrimental to the value of the clean output.

It is notable, although not surprising to CWH, that Dr Carnaby does not make that claim. This is unsurprising to CWH because the statement is simply untrue.

Mr Fookes states:

> The wool buyer determines the buying strategies, and the blending options, when purchasing the greasy raw wool for the scourments. On average around 13 different greasy raw wool lots go into a single scourments. Each of these will have been purchased with knowledge of their individual objective measurements. It is completely feasible for the buyer to adjust any of the characteristics in the buying strategy without changing other characteristics.

Mr Ranford says, to similar effect:

> When using multi dimensional analysis of the wool quality parameters that make up the New Zealand clip, such as colour, fibre diameter, fibre length, vegetable matter, etc, there will be portions of the clip where the fibre quality parameters, other than base Y, remain the same even though base Y changes by 1 unit.
>
> As the tonnage of the national clip decreases this becomes more difficult to achieve however it is generally possible to build a consignment for typical carpet blends with a base Y value of 1 unit lower while maintaining all other quality parameters at a level that meets the specification required by the wool trade.

Furthermore, the proposition that base Y is perfectly correlated is in direct contrast to:

- the seemingly undisputed evidence that Y has a value, including from WSI's own expert – base Y cannot be valuable on the one hand and unable to be separately recognised on the other;

- the econometric evidence in the studies referred to in the NERA report – it would not be possible to run econometrics if the quality variables were correlated;

- the fact that customers/exporters specify a minimum base Y value – if the base Y value moved in unison with all other negative value parameters there would be no net value and therefore no reason to do this; and

- **[**

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2.2 ***Alternative ways to conceptualise base Y benefit value***

There appears no question that base Y has a value and that increases in base Y would generate benefits to New Zealand. Accordingly, while the NERA report and the CWH application focus on the ability for merchants to buy a mix of greasy wool with a lower base Y value while still achieving the same clean base Y value, there are equally valid ways in which the benefit could be conceptualised. Those are either as:

- merchants/exporters selling clean wool with a higher base Y value for a given greasy wool blend; and/or

- savings in the amount of bleach needed to achieve a specified base Y specification for a given greasy wool blend.

In reality, the actual benefit will arise from merchants/exporters adopting a mix of all three strategies, i.e., acquiring greasy wool with a lower base Y value, selling clean wool with a higher base Y value, and reducing their bleach spend. For the purposes of quantifying the benefit, CWH and NERA focussed on one strategy to avoid any suggestion of double counting.

This section explains the alternative ways to conceptualise the base Y benefit.

(a) *Increase in base Y value increases price offshore*

This alternative arises as follows:

- for a merchant/exporter to buy greasy wool with the same base Y input;
- obtain a clean wool with a higher base Y value through the scouring process; and
- sell that higher base Y value clean wool output and attract a higher price.

The benefits to the merchant/exporter and to New Zealand would be almost identical to the benefits quantified by NERA in its 8 February report.

(b) *Saving in bleach costs*

As the Commission is aware, one way to increase the base Y (and decrease the Y-Z) value of clean wool is to add hydrogen peroxide (i.e., bleach) during the scouring process. Adding bleach allows a customer to achieve a higher base Y value (lower Y-Z value) holding all the other parameters of the wool constant.

Dr Carnaby describes the addition of bleach as "relatively common". In fact, the majority of New Zealand wool is bleached to some extent and that is one reason for the difference between the greasy wool and clean wool base Y values shown in the figure on page 1.

It is exporters/merchants who instruct CWH to apply bleach. An exporter/customer will do this when it does not consider that the greasy wool blend it is providing will otherwise achieve the minimum base Y (and/or Y-Z specifications) set by a customer.

Exporters/merchants using CWH for scouring generally only require low levels of bleach because the base Y specification will be met by mechanical, not chemical, means. Customers such as **[ ]** are opposed to material use of bleach because of the damage it causes to the clean product.

(i) <u>Customers pay to add bleach to improve base Y value</u>

Customers pay separately for the bleach they instruct CWH to apply. In essence, a merchant/exporter can trade off a lower priced wool (with a lower base Y) versus the improvement they get through applying bleach.

If the cost of bleach is less than the improvement in clean wool value, then it makes sense for a customer to apply bleach unless the use of bleach causes damage to the final product.

This practice of using bleach to achieve an increase in base Y in itself indicates that increased base Y has a value.

Bleach is sold by the "volume" with the standard measures being a ½ volume, 1.0 volume, 2.0 volume or 3.0 volume. The "volume" measurement is a

standard test developed specifically for the scouring industry. Scourers check the "Volume Strength" by a simple and standard "Titration Method" which tests the strength of the peroxide in the last bowl of the scour.

Prices are set on a clean basis, i.e., volume per kg of clean wool scoured. **[ ]** the standard price for peroxide per volume is:

- ½ volume = **[ ]** cents;
- 1.0 volume = **[ ]** cents;
- 2.0 volume = **[ ]** cents;
- 3.0 volume = **[ ]** cents.

CWH estimates the cost of bleach per 1 volume of bleach is **[ ]** cents per greasy kg (**[ ]**).

(ii) Cost savings benefit from CWH improvements

While bleach improves the base Y value, CWH has demonstrated that it has achieved a 1 unit increase in base Y value in the North Island despite actually slightly decreasing its peroxide usage.

To turn this around, this means that CWH's customers are now able to use *less* bleach to achieve the same base Y output for the same overall quality of greasy wools being scoured. A decrease in the amount of bleach they have to use amounts to a cost saving to them.

While there are many factors[7] which affect the pickup or absorption of bleach into wool during scouring of the wool, in CWH's experience, **[**

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Accordingly, because CWH can improve the Y unit through its mechanical processes, customers can now reduce the volume of bleach they use to achieve the same base Y output.

To illustrate, consider the following example:

- suppose the end-user customer has specified a minimum base Y of 67;
- the customer acquires the greasy wool with a 65 base Y value;
- the customer knows that to do this it will need to apply bleach – **[ ]** of bleach is needed to improve base Y value by 1 unit;
- if its scourer **has not made** the improvements which CWH has made, it will need to add **[ ]** of bleach at a price of **[ ]** cents per clean kg;
- if it is **scouring with CWH** and hence its wool is being scoured on the mechanically improved CWH scour lines:

[7] For example, wool type, residence time, dryer temperature, bowl temperature and bowl discharge.

- it knows CWH will improve the base Y value from 65 to 66 through its scouring process;
- it will need to purchase the bleach required to get the wool from 66 to 67 which is **[ ]** at a price of **[ ]** cents per kg clean; and
- the merchant/exporters' costs decrease from **[ ]** cents per clean kg to **[ ]** cents per clean kg – a saving of **[ ]** per clean kg.

CWH believes this fairly reflects the cash cost savings benefit its customers have achieved from its scouring improvements.

There are other benefits as well however; given the **[ ]**. Removing as much bleach as possible from the scouring process will reduce processing losses and therefore enhance the quality of the wool exporters can provide to customers.

(iii) Benefit for WSI wool

By making the same mechanical modifications to the WSI scour lines as it has made to its own scour lines at Timaru and will make at Awatoto (following expansion), CWH is satisfied it will achieve a 2 unit base Y increase on WSI wools without increasing the use of peroxide.

Holding the greasy input wool and the output specifications constant, what this means is that those wools will be able to be scoured using **[ ]** less of bleach than is currently the case.

This is a saving of **[ ]** cents per greasy kg.[8] Based on WSI (North and South Island) volumes, this implies a saving of **[ ]** per year or a present value of **[ ]** over five years.

(The one unit uplift for CWH wool on the Awatoto site due to bringing the 2.4 lines up to Timaru specification would increase this benefit to approximately **[ ]** over five years.)

Because this is a variable cost saving, it would also have a price effect (drop), and therefore an allocative efficiency gain. NERA have calculated the impact of this.

If we conservatively assume an effective price drop of **[ ]**[9], the NERA allocative detriment model produces a present value national benefit of **[ ]**[10] Assuming the same per volume price reduction on the **[ ]**[11] on CWH North Island volumes yields an **[ ]** This benefit can be added to the cost

[8] Note that to calculate this figure we converted 1 tonne of bleach (the unit CWH purchases) to litres. We have assumed that 1 litre of bleach weighs 1 kg. This is conservative given that bleach is denser than water. Using the actual ratio would thus result in fewer litres per tonne and thus a higher cost per litre.

[9] This is conservative because the first volume of bleach is charged at **[ ]** cents and every volume after is charged at **[ ]**. Some customers may use only 1 volume of bleach in the counterfactual and no bleach in the factual and thus would face an effective price **[ ]** cents lower.

[10] The lower and upper ends of this range correspond to an elasticity of -0.5 and -3 respectively.

[11] i.e. price drops by **[ ]** cents.

savings calculated above giving a total present value benefit to New Zealand of **[ ]**.

2.3 ***Benefit to offshore customers***

NERA have responded to the proposition that the incidence of the quality benefit will be primarily to foreigners. They disagree with this proposition, although they acknowledge that over time some of the benefit will be distributed to overseas consumers they say:

> …we believe that in the early years of the five-year period that our analysis covers, relatively little benefit would be passed offshore – during this period, most of the benefit would be distributed between the merged entity, merchants and growers. Pass through to consumers would increase over time though, and may become material towards the back end of the five year time period. Of course, the further out in time this is, the lower its present value.

3. **Why these changes will not be achieved in the counterfactual?**

CWH has seen no evidence that there is any "real chance" that WSI (or another owner of WSI) will make the modifications necessary to achieve the base Y benefits discussed above. There is every reason to believe they will not and cannot.

In respect of the latter point, it is not correct to characterise the modifications CWH has made as simply "off the shelf" improvements which can simply be brought. They reflect the experience, knowledge and intellectual capital of CWH management (primarily Nigel Hales, Jim Drake, Tony Cunningham and Bevan Abraham), built up over a period of 10 years. WSI could not replicate this knowledge and intellectual capital.

However, and in any event, the question is not whether WSI "could" make the improvements, the question is whether there is a "real chance" that they would, i.e., whether they would have the incentive to do so. There is no such real chance.

Perhaps the best evidence of that is that WSI has not sought to make similar modifications to date. This is despite rebuilding its Whakatu scour line in 2006. There is no reason to believe this will change.

The key reason is that achieving a base Y uplift is not the driver for CWH's modifications.

CWH was incentivised to make its modifications (and in the factual will be incentivised to make further modifications to the Awatoto scour lines) to increase throughput and capacity. It achieved these by increasing the run-rate from its Awatoto scours from **[ ]** greasy kgs per hour to **[ ]** greasy kgs per available hour, an increase of close to **[ ]**.

That was the rationale for the modifications and is the rationale for the changes it is intending to make to the WSI scour lines. The base Y improvements are a by-product of that improvement – they are to the advantage of CWH's customers and wool growers, not CWH directly. (CWH would benefit directly if the additional capacity allowed it to increase volumes.)

Accordingly, absent a need for more capacity, there would be no incentive for either WSI or CWH to invest in changes to increase throughput and volume. No additional volumes would flow – excess capacity would simply grow, particularly given New Zealand's declining wool environment. No rational firm would base an investment case on a material *increase* in New Zealand wool volumes. A best case scenario would only see sheep numbers and wool volumes holding steady over the medium to long term.

Accordingly, WSI in the counterfactual does not have, and cannot be expected to have, such a greater volume of wool to scour that it would need to increase capacity (and for that matter, nor does CWH).

For WSI this is exacerbated by the fact that making the modifications in the counterfactual (if indeed they can be achieved given physical and environmental limitations) would require WSI to invest capital in building and scour line alterations. As the Commission is aware, WSI is not providing an adequate return on equity invested to do so.

Simply put, WSI has no incentive to invest to increase its available scouring capacity. Since the Y benefits will not arise without necessarily investing in materially increasing capacity it can safely be concluded that there is no real chance these benefits will arise in the counterfactual.

It is only in the factual, whereby CWH gains greater volumes that it must scour (the WSI volumes), whilst also being incentivised to gain economies of scale by closing some scour lines and expend the capital to enhance the remaining scour lines to increase capacity, that the by-product of achieving an increase in the base Y comes about.