



final report

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THE VALUE OF VERY FAST CHILLING AND SALTING OF PRE-RIGOR MEAT FOR THE AUSTRALIAN BEEF INDUSTRY: AN EX-POST COST BENEFIT ANALYSIS OF "NUMEAT" (INCLUDING PROJECTED VALUE OF EXTENDED SHELF LIFE)

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Executive Summary

"Numeat" is a novel meat product created from very fast chilling and salting of pre-rigor beef to prevent pH decline. A range of Numeat products under the "Mr Beaks" brand have been successfully launched in the past 2 years in Figure 1 below. The product has been proven to enhance eating quality and improve shelf life without preservatives due to much lower microbial levels. Consumer acceptance of pricing at levels higher than the original premium price targets support their acceptance of the improved quality. Numeat has generated incremental growth in Retail Sausage Category Sales and represents significant value to the Australian beef industry. Benefits have been realised in every sector of the supply chain. Meat can be sourced from either hot or cold boning plants but cold boning plants are likely to benefit up to \$0.06/Kg more from the process than hot boning plants.

The benefits arising from Numeat in the past 12 months are estimated at approximately \$5.3 million across the entire supply chain. This equates to \$4.98/Kg of additional value for whole supply chain. Direct increase in value to the current supply chain is \$1.69/Kg or \$9.29 per head in Table 1 based on using 10% of the carcases saleable yield for Numeat. Upwards of 40% of carcases saleable yield could be used for Numeat production and would increase direct value to the red meat industry¹ to \$36.72 per head.

Consistent month-on-month sales growth up to the time of writing this report indicates annual sales volumes could increase beyond 4000MT in the next 3 years but are unlikely to reach the ex-ante projection of 6000 metric tonne (MT) within the current retail supply chain within three years.

	Processing and Value-adding							
BENEFITS		\$/kg	Ċ,	i/hd	d Total plant			
						benefit		
Reduced Labour Cost	\$	0.02	\$	0.10	\$	19,574		
Reduced Working Capital	\$	0.001	\$	0.04	\$	8,441		
Numeat Price Premium - Increase Margin	\$	1.63	\$	8.95	\$	1,740,466		
Increased capacity - reduce fixed cost/kg	\$	0.04	\$	0.19	\$	37,736		
Total Processing Benefit	\$	1.69	\$	9.29	\$	1,806,217		
COSTS		\$/kg			Т	Total plant benefit		
Capital Cost for Boning Equipment	\$	0.27	\$	1.49	\$	289,185		
Total cost	\$	0.27	\$	1.32	\$	256,971		
Total net \$ benefit	\$	1.42	\$	7.80	\$	1,517,033		

Table 1: Numeat's direct increase in value created for the red meat industry²

² Based on 1,000MT for financial year 11/12



¹ Direct red meat industry benefit is reported here as the increase in value from livestock purchase to wholesale finished product value (Hot Boning + Value-add Processor in Table 1). Additional increase in margin was created post processor in this supply chain. Wider industry benefit will vary depending on the split between foodservice and retail.

This *ex-post* CBA was conducted using commercial data supplied by Beak and Johnston Pty. Ltd. and includes operational costs at the primary and secondary processing plants along with retail scan data over the past 12 months.



Figure 1: Current range of Mr Beak's sausages using the Numeat raw material process



1. Introduction

"Numeat" is a novel meat product created from very fast chilling and salting of pre-rigor beef to prevent pH decline. A range of Numeat products under the "Mr Beaks" brand have been successfully launched in the past 2 years. The product has been proven to enhance eating quality and improve shelf-life without preservatives due to much lower microbial levels. Numeat has generated incremental growth in Retail Sausage Category Sales and represent significant value to the Australian beef industry. This ex-post CBA was conducted using commercial data supplied by Beak and Johnston Pty. Ltd. and includes operational costs at the primary and secondary processing plants along with retail scan data over the past 12-months.



Figure 2: Current range of Mr Beak's sausages using the Numeat raw material process

2. Objectives

The aim of this report is to communicate the benefit Numeat is generating to the Australian beef industry and to identify issues that require further attention. The primary deliverables were to:

- 1. Develop a model to assess the value of "Numeat" to each sector of the supply chain over the past year
- 2. Estimate the likely increase in value that will be created from this project to increase product shelf life.
- 3. Review sensitivities that could have Go/No Go implications for proceeding with the next stage of the project development.



3. Results and Discussion

Ex-ante and *Ex-post* comparison

The following Table 2 provides a comparison between the original *ex-ante* CBA and the *ex-post* results at June 2012. Note the original *ex-ante* CBA was based on forecasted sales volumes of 6,000MT per annum in the third year after launch which is 2014. Actual performance results from this study have been used to forecast likely value generated from Numeat when the *ex-ante* volumes are reached. This is represented in the third column of the table. Note a more detailed comparison is provided for each supply chain sector the appendix in Table 16 on page 11.

Tuble 2. Ex unte una Ex post comp	u1130	5115																
COST - BENEFIT ANALYSIS OF NUMEAT		(600	e N 00	Ex-Ante C 1T Year 3	BA Fore	cast)	Ex-Post CBA (2012 - 1000 MT)					Ex-Post CBA (6000 MT per Ex-Ante)						
Original Ex-Ante		w	HOI	LE SUPPL'	ү сн	AIN		W	HOL	.E SUPPL'	(CH)	AIN		w	HOL	.E SUPPL	/ CH	IAIN
	Ho	t/Cold?				Hot	Но	t/Cold?				Hot	Но	t/Cold?				Hot
BENEFITS		\$/kg		\$/hd	T	otal plant		\$/kg		\$/hd	Т	otal plant		\$/kg		\$/hd		Total plant
						benefit						benefit						benefit
Reduced Labour Cost	\$	0.03	\$	0.94	\$	182,400	\$	0.02	\$	0.10	\$	19,574	\$	0.02	\$	0.56	\$	109,762
Reduced Working Capital	\$	0.007	\$	0.253	\$	49,087	\$	0.001	\$	0.043	\$	8,441	\$	0.007	\$	0.243	\$	47,334
Numeat Price Premium - Increase Margin	\$	5.38	\$	165.98	\$	32,266,094	\$	4.92	\$	27.07	\$	5,261,874	\$	4.93	\$	152.26	\$	29,598,800
Remaining hot boned product (Price increase)	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
Reduced Chiller Shrink	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
Increased yield (Hot boning in Cold plant)	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
Boning efficiency (Hot bone in Cold plant)	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
Increased capacity - reduce fixed cost/kg	\$	0.17	\$	5.09	\$	990,356	\$	0.04	\$	0.19	\$	37,736	\$	0.17	\$	5.09	\$	990,356
Increased Market Share - Profit Margin	\$	0.22	\$	-	\$	-	\$	0.22	\$	-	\$	-	\$	0.22	\$	-	\$	-
Longer Shelf Life - Less Markdowns	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
EX-ANTE Processing Benefit	\$	5.58	\$	172.26	\$	33,487,937	\$	4.98	\$	27.41	\$	5,327,625	\$	5.12	\$	158.16	\$	30,746,251
COSTS		\$/kg			Tot	al plant Cost		\$/kg			Tota	al plant Cost		\$/kg			To	tal plant Cost
Capital Cost for Boning Equipment	\$	0.01	\$	0.35	\$	68,068	\$	0.27	\$	1.49	\$	289,185	\$	0.05	\$	1.49	\$	289,185
EX-ANTE Total cost	\$	0.01	\$	0.35	\$	68,068	\$	0.27	\$	1.49	\$	289,185	\$	0.05	\$	1.49	\$	289,185
EX-ANTE Total net \$ benefit	\$	5.57	\$	171.91	\$	33,419,869	\$	4.71	\$	25.92	\$	5,038,440	\$	5.08	\$	156.67	\$	30,457,067

Table 2: Ex-ante and Ex-post comparisons

Key differences between the previous ex-ante CBA and the current ex-post review are as follows:

- 1. Raw material cost paid to the abattoir has increased from \$3.10/Kg to \$3.97/Kg due to livestock pricing.
 - a. The abattoir has maintained a fixed premium of \$0.61/Kg above market prices³.
 - b. Raw material cost increases have been absorbed by the value-added processor.
- Consumer's everyday price has been achieved at \$13.31/Kg compared with the previous estimate of \$11.20/Kg. This helped the value-added processor absorb some of the raw material increases but most of the benefit was passed to the retailer as pricing is calculated on a fixed percentage margin on sales.
- 3. Volume of 6000MT compared with 1000 MT in 2012.

³ Raw material price premiums were calculated as the difference between export 80CL Cow trimmings price reported by MLA's market reporting service in the month Numeat product was purchased and the price paid for Numeat processed product.



4. Volume of 6000MT was used in the ex-ante forecasts for financial year 2015/16. The ex-post analysis is prior to this forecast and uses 2011/12 volumes of 1000 MT.

Description of the current model

The model has been designed to easily adjust volumes, pricing, labour and other variables in order to determine various sensitivities. The modelled figures included in this document include inputs supplied by Beak and Johnston Pty. Ltd including the following model drivers:

- 1,000MT of Numeat product sold in 2012. The volume is actual scanned sales for one of the major retailers. It is anticipated this volume will continue to grow. The model is based on 2012 figures. The previous ex-ante CBA used three year forecasted volumes and value estimates at 6,000MT per annum.
- 2. An end consumer sales price of \$13.31/Kg has been achieved. This has increased from the price of \$11.20/Kg used in the ex-ante CBA. Given the month on month growth in sales, \$13.31/kg appears to be a sustainable price.
- 3. Equipment required to deliver the Numeat product has been installed at one abattoir only, and at the value-adders expense.
- 4. The abattoir processes approximately 190,000 head per year with 40% being Numeat eligible specification. The target sales volume in the ex-ante study assumed 65% of the saleable meat is recovered for Numeat from these carcases.
 - a. In reality the total volume was achieved with various combinations of carcase eligibility and cut recovery over the past year and only 10% of the saleable meat was required from suitable carcasses to meet 2011-12 sales volumes.
 - b. Table 3: Abattoir drivers in CBA model summarises variables that impact on value generated per head. To keep consistency with the previous Ex-Ante study, \$/head has been reported using the same standard of 40% carcase eligibility and 63% of saleable meat from carcases used for Numeat. Note a smaller percentage of the carcase was used in the past start-up year

relative to the 3 year volumes used in the previous ex-ante CBA.

able 5. Abattoli unversili CDA model										
PLANT SPECIFIC DRIVERS										
Do you use Spray Chilling? (Y/N)	N									
Cold Boning Plant - chiller shrink										
reduction										
	0.5%									
Process rate (ccs/min/chain)	1.8									
Number of chains	1.0									
Length of shifts (min)	450.0									
Days/week	5.0									
Average carcass weight	180									
% meat per carcass	73%									
Average carton weight	25.0									
Carcasses per shift	810									
Days/year	240									
Shifts/day	1									
Carcase % acceptable for Numeat	40%									
% of carcase suitable for Numeat	68%									
Number of head processed daily	810									
(Y/N) [N = industry averages used]	Y									
Number of head processed p.a.	194,400									
Boned meat product (kg/year)	25,544,160									
Potential NUMEAT product (kg/year)	6,979,473									
REQUIRED NUMEAT volume	1,070,000									
Carcases required for Numeat volume	29,803									
Days collecting Numeat	37									
Numeat/shift	29,081									
% of carcase needed for volume	10%									
Useful life of VFC equipment	10									

Table 2. Abottoir drivers in CDA model



Estimated Return per head

Reporting of value benefit on a per head basis depends on what portion of the saleable carcase yield is used and the portion of the total carcases this represents. Direct increase in value to the current supply chain is \$1.69/Kg or \$9.29 per head⁴ in Table 1 based on using 10% of the carcases saleable yield for Numeat. Upwards of 40% of carcases saleable yield could be used for Numeat production and would increase direct value to the red meat industry to \$36.72 per head.

Specific Benefits Explained

A brief description of the drivers of each of the benefits is included in the following sections.

Abattoir Benefits

a) Processing infrastructure changes

Trimming station and labour changes were required at the abattoir to enable the Numeat process to be applied within 40 minutes of slaughter. Additional processing equipment installed at Beak and Johnston's cost at the abattoir to mince, salt, and mix and chill the raw material are included in the Value-added processing cost section. These costs are explained below and are reflected as an increased purchase price for the value-adding company.

b) Raw Material Cost

A change in the boning process was made to allow for removal of the hot meat at the end of the slaughter floor.

The abattoir receives a price premium for the product supplied under this process. The premium was agreed prior to commencing the project and considered an incentive to allow changes to their boning process and to ensure continued supplied. The price premium is \$0.61/Kg ex-works above current market prices. Raw material prices have increased since the ex-ante study was conducted and is reflected in the comparative analysis in Table 2.

⁴ Direct red meat industry benefit is reported here as the increase in value from livestock purchase to wholesale finished product value. Additional increase in margin was created post processor in this supply chain. Wider industry benefit will vary depending on the split between foodservice and retail.





Table 4: Price differential between Numeat processed raw material and equivalent cow trimming prices

c) Labour Saving - Numeat process.

Savings in processing costs are an additional incentive to the abattoir. These savings are explained below.

Labour costs associated with Numeat are less than conventional processing and represent a labour saving of 3.5 full time equivalents, as included in the table below. The primary labour differences include:

- Assuming up to 60% of the meat is being diverted to pallecons on the slaughter floor at times when Numeat is being processed, significantly less volume should result in labour savings in the plants standard processes including trim sortation, carton assembly and carton pack off areas. Further savings in reduced plate freezer loading and unloading, as well as reduced frozen pallet palletizing also occur.
- 2. An additional labourer at raw material recovery on the slaughter floor has been added to oversee the automated capture of boned out meat onto the belt and application of snow.
- 3. No additional boning labour is required; rather a transfer of boning labour from the conventional boning room to the end of the slaughter floor.



Day Production Shift -	Standard Process (27.2 kg			Numeat Process					
Potential Labour Savings	FZN	CTN	1)						
dof	Labour Units	Lab	our/day	Labour Units	Labour/day				
Slaughter Floor									
Pre-bone trimming (extra)	0	\$	-	0.0	\$-				
Trim collecton & Transfer	0	\$	-	1.0	\$ 152				
CO2 snow application	0	\$	-	0.5	\$ 76				
Boning									
Boning labour tnsfr to Numeat	1	\$	152	1.0	\$ 152				
Packing, Freezer, Palletising									
Trim pre-sort inspection	1	\$	152	1.0	\$ 152				
CL Sorting table	1	\$	152	1.0	\$ 152				
Packing trim into ctns	4	\$	608	1.5	\$ 228				
Frozen Lidder	0.5	\$	76	0.5	\$ 76				
Frozen Plastic liner inserts	0.5	\$	76	0.0	\$ -				
Frozen carton palletizing	4	\$	608	2.0	\$ 304				
Pallet loadout	2	\$	304	2.0	\$ 304				
TOTAL	14	\$	2,128.00	11	\$ 1,596				
Savings per shift				3.5	\$ 532.00				

Table 5: Changes in labour manning by shift

Although there is a variation in processes between hot and cold boning, it has been assumed the change in number of labour units would be the same for cold boning processes.

d) Increased Sales Volume - Increased allocation of fixed costs (Abattoir)

The assumption in the ex-ante CBA was that total raw material for Numeat would be incremental to the abattoirs existing volume. The reduction in fixed cost per kilogram as a result of a 6000MT/p.a. increased volume was assumed to improve profit margin by \$0.03 per kilogram in the ex-ante CBA. In reality, high exchange rates and high meat costs have limited the increase in abattoir production. This benefit has been removed from the current 2012 ex-post CBA. Given these economic conditions are cyclical, the previous ex-ante benefit of \$0.03/Kg has been included in the longer term ex-post estimate in Table 2 on the basis that plant volumes will increase as the market becomes more favourable.

The allocation of fixed costs has been "estimated" very loosely at the abattoir and could vary significantly from this figure. Total fixed costs are anticipated to be more than that stated here and as such, the total benefit reported below is expected to be conservative. Note the savings here reduce to \$0.01/Kg for 2012 due to reduced volumes.



c) Capacity Incre	ease - reduced fixed cost alloca	tion
Item	Total	/Kg
Current production volume / plant (MT)	25544.16	
Numeat volume not frozen (Total Industry (MT) 6000	
Plate Freezer Capacity Increase (MT p.a.)	6000	
Annual Fixed Costs	\$ 4,597,949	\$ 0.18
Fixed Cost/kg after volume increase		\$ 0.15
Margin Increase per annum	\$ 1,080,000	\$ 0.03

 Table 6: Impact of increased volume on abattoir fixed cost/Kg for 6000MT volume increase

e) Reduced Working Capital Requirement

Table 7. Impact of Number on working conital

Normal processes for slaughtering, boning, packaging, plate freezing and palletizing of meat take at least 3 days from raw material purchase through to frozen storage. An additional 7 days of cold storage before load-out would be a reasonable estimate of average on-site storage time.

The cost of this product ties up working capital. Shipment of Numeat product has reduced this working capital by at least 10 days. The value of money for this period has been estimated below with the same saving in working capital assumed for both hot and cold processors.

able 7. Impact of Numeat of Working Capital														
g) Reduced Inventor	y (Working Ca	apital)												
Assumptions:	ssumptions:													
Numeat process allows same day loadout of chilled trim, compared with 3 day freeze/palletise/frozen storage, plus frozen store inventory of 7 days														
For high quality chilled product (outside Numeat process) VFC equipment gives acceptable tenderness after 4d ageing, whereas 14d is reqd for std process														
Assumptions:		F	or Hot Boned Plant	6		F	or Cold Boned Plar	nts						
Reduction in inventory			10	days			10	days						
% Sales kg increase due to consistent eating expension	riences=	<mark>0%</mark>				0%								
How many years after installing VFC?			3	years			3	years						
Gross margin			0%				5%							
Amount of product (all product sold chilled)		6,000	tonnes / per annum	L. C.		6,000	tonnes / plant per	annum						
Value of product	\$	4,273	\$/tonne		\$	5,293	\$/tonne							
% of plants supplying primarily to domestic market		100%				25%								
Expected profit - Sales kgs increased due to consist	tent quality \$	-	per plant per annun	า	\$	-	per plant per annu	m						
Value of reducing inventory (reduced finance on inventory) =		49,172	per plant per annun	า	\$	60,909	per plant per annu	m						
Total savings through faster loadout	\$	49,172	per plant per an	num	\$	60,909	per plant per a	nnum						

Abattoir - Cold Boning Plants Only

The one abattoir producing Numeat raw material at this point is a hot boning plant. Impact of Numeat processing on a cold boning plant has not been validated so this section should be considered ex-ante calculations.

a) Reduced chiller shrink loss (Cold-boning plants not using spray chilling).

Plants producing Numeat will divert meat from carcase chillers with a reduction in chiller shrink in Table 8 below based on the following assumptions:

• It is expected drip loss will be negligible from Numeat product derived from cold boning operations that do not utilise spray chilling;



• Recovery of meat prior to carcase chilling allows drip loss from standard beef side chillers to be removed (conservatively estimated at 0.5%) for cold boning operations currently without spray chillers.

Table 8: Reduced chiller shrink

f) Reduced	Reduced chiller shrink loss (cold-boned plants not using spray chilling)											
i.e. weight loss from hot-boned or spray chilled carcasses is minimal												
Weight loss (cold-boned process)				0.5%								
Weight loss (VFC / Numeat process)				0.0%								
Value of product (Numeat only)			\$	5,400	\$/tonne							
Amount of Numeat product				6,000	tonnes per annum							
% of plants that cold-bone & don't use sp	oray chilling			90%								
Savings by selecting VFC instead	of std chiller		\$ 1	62,000	per plant							

b) Increased boning efficiency (Cold boning plant only).

Increased Increased boning efficiency can be achieved by hot boning of cuts. Implementing Very Fast Chilling technology (VFC) to chill primals pre-rigor preserves cold boned meat quality. It has been identified that up to 40% saving in the cost of bone out labour by converting from cold to hot boning is achievable. However, we have used a conservative assumption of 3% boning efficiency gain in the model because only part of carcases will be boned hot with the remainder being boned cold. Modelled assumptions are included in Table 9 below. Cold boning labour has been costed at \$0.55/Kg. Functionality is included in the associated model for users to change these values to suit plant specific requirements.

Table 9: Boning efficiency benefit h) Increased boning efficiency (Cold Bone only) \$0.55 Cost of labour for cold boning operation 3.0% Increase in efficiency with warmer carcass Total labour cost of boning only (cold boning) 550,000 \$ \$ 16,500 Annual Saving \$68.75 Daily saving Saving per kg \$ 0.02 80.0 Saving per head per year S

c) Increased bone-out meat yield (Cold boning plants only).

Boning primal cuts of meat pre-rigor will result in increased meat yield compared to existing cold boning operations. It has been identified that increases in saleable meat yield of 2.0% arising from this conversion from cold to hot boning are achievable but a conservative figure of 0.5% has been used in this scenario (See Table 10).



Table 10: Bone yield benefit

Increased bone-out meat yield (Cold Bone only)											
Product volume boned hot (previously cold boned) Estimated increased SMY arising from hot boning Increased bone-out yield Average value of meat /kg	\$	6,000,000 kg 0.50% 30,000 kg per annum 3.10 per kg									
Increased bone-out value per year value per kg value per head	\$ \$ \$	93,000 per annum 0.02 per kg per year 0.48 per hd per year									

Value Adding and Retailer Benefits

a) Increased profit margin - increased eating quality delivers increased sell price

The product formulations in Table 11 below compare between the existing "budget sausages" sold in major retailers at a \$5.99/Kg price point and the Mr Beak's range of high quality sausages using Numeat retailing at \$13.31/Kg.

The improved functional properties of Numeat, along with improved self-life without the use of preservatives have exceeded the targeted premium of \$11.20/Kg set in the prior ex-ante CBA.

Numeat sausages have been able to deliver an eating experience that compares more with a lower priced steak than with a sausage. It was anticipated a new market for Numeat would be created in the first instance, resulting in incremental sales volumes. Sales figures for 2012 reported later in the document support this.

A profit breakeven for the value-adding company was identified at an end consumer sell price of around \$7.15/Kg assuming the retailer maintained their 35% margin at the Distribution Centre and all other costs in the model remained static.

d) Increased consumer sell price - higher eating quality											
Assumptions:											
Price differentiation from existing product	Budget Sausa	age Formulati	\$	5.28	Numeat F	ormulation	\$ 11.20	Margin Increase			
Ingredient Costs	% of total	\$/kg			%	\$/kg					
Gross Profit at DC		24.0%	\$	1.27	Retail	35.0%	\$4.66				
Gross Profit at store		14.6%	\$	0.77	Markup	30.5%	\$4.06	\$3.29			
Sell Price			\$	5.28			\$13.31				

Table 11: Sales price benefit

b) Reduced retail markdowns

Numeat raw material will assist in delivering a longer shelf life due to reduced raw material microbial load. This is reflected as a benefit of less markdowns or dumps at retail because the product has more life on shelf.

The saving is estimated as the difference between the downgraded product price and the full product price, multiplied by the percentage of total annual chilled product estimated to reach the price downgrade threshold. The retailer realises this full benefit. Access to this information was not made available by the retailer so is included in this ex-post CBA as assumed benefits.



Note reduction in markdowns is only appropriate for existing product that benefits from replacing existing raw material with Numeat raw material. Given Numeat is only incremental sales at the time of this ex-post review, no value is included in Table 12 or in the summarised benefits in Table 2 on page 6.

Volume under the "Numeat market share increase" in Table 12 below includes volumes where Numeat products gain market share from competing proteins like chicken and pork. These numbers are not based on any market intelligence but intended to estimate the potential volume of products that could benefit from the Numeat process over time. Potential volumes have not been included in the model results reported here as the existing products have only recently launched. However, model functionality has been included to refine these numbers if appropriate.

"Numeat raw material replacement" volumes in the Table 12 below result from existing sausage product raw material being replaced in part by Numeat. The retailer trend to remove preservatives supports this volume increase although the volumes modelled in this report did not include these items.

e) Increased market share - Improved eating quality												
Assumptions:	Assumptions:											
Increase market share for Austral	ian beef											
Market	Existing	% Numeat	tonnes	Recommend	Markdown	tonnage	Mar	rkdown value				
Opportunity	Mkt MT	used		ed Price	%	saved		saved				
Incremental Sales												
Woolworths	50%	100%	1070									
Other Retailers	50%	100%	1070									
Export												
NuMeat - Incremental new produ	uct sales		2140			0	\$	-				
Capture Market Share												
Chicken		93%	1000	8.99	5%	50	\$	179,800				
Pork		100%	1000	8.99	5%	50	\$	179,800				
Higher Vaule Red Meat		40%	2000			0	\$	-				
Low Value Sausage		38%	750	8.99	5%	37.5	\$	134,850				
Numeat - Market share increase			4750			137.5	\$	494,450				
Replace existing budget sausage ra	aw material											
Woolies (500MT/wk)	26000	50%	13000	5.99	5%	650	\$	1,557,400				
Other Retailers	26000	50%	13000	5.99	5%	650	\$	1,557,400				
Rissoles/Meat Balls/Burgers	5200	50%	2600	5.99	5%	130	\$	311,480				
		0%	0									
Numeat - Raw material replacem	1070		28600			1430	\$	3,426,280				
Numeat raw material opportu	nitity		35490			1567.5	\$	3,920,730				

Table 12: Forecast use of Numeat raw material over time

Note the volumes above are able to be selected on the front page of the model to be included or excluded as desired. Table 13 demonstrates the ability to select the appropriate volumes and adjust retail sales price.



fable 13: Volume modelling controls in CBA model											
Numeat Sausage - Consumer \$/kg	\$ 11.20)	\$	13.31							
INCREMENTAL sales of Numeat (MT) Woolies	6,000) Y		1,070	Ŷ						
INCREMENTAL sales of Numeat (MT) Other retail	6,000) Y		-	N						
PRODUCT REPLACEMENT Numeat sales (MT)	4,750	Y		-	N						
RAW MATERIAL MT (Replace current sausage)	28,600) Y		-	N						
TOTAL NUMEAT - market volume (MT)	45,350)		1,070							

c) Increased Sales Volume - Increased allocation of fixed costs (Value-adder)

The assumption in Table 14 below is that total raw material for Numeat will be incremental to the value-adding plants existing volume. The reduction in fixed costs/Kg as a result of increased volume improves profit margin by \$0.05/Kg on the current volume of 2,000 MT per annum. Three year forecasts of 6000MT/year would generate savings of \$0.13 per kilogram on fixed costs.

The allocation of fixed costs for value-adding is based on closer estimates of fixed costs than those available for the abattoir calculations. Therefore this benefit is quite realistic.

Item	Total	/Kg
Current production volume (MT)	23400	
Numeat volume not frozen (MT)	2000	
Plate Freezer Capacity Increase (MT p.a.)	2000	
Annual Fixed Costs	\$15,000,000	\$ 0.64
Fixed Cost/kg after volume increase		\$ 0.59
Margin Increase per annum	\$ 1,282,051	\$ 0.05

Table 14: Volume increases reduce fixed cost/Kg

Consumer acceptance of product quality has been proven with continued sales growth demonstrated in Figure 3 through Figure 5.



Figure 3: Incremental sales growth



The ratio in Figure 3 is Mr. Beak's market share of the total sausage category and indicates that Mr sales volumes are incremental above the existing sausage category volumes. The combined sausage category has not decreased in volume over the 12 months. The normal peaks in volume at the beginning of summer and through the Christmas-New Year period still occur in both sausage categories. However, the peak in Mr Beaks range is minimal relative to the main category. This is easily seen in the green ratio line (market share) at these peak times. Throughout the year Mr Beak volumes are more stable indicating the Numeat product is substituting as a cheaper everyday alternative to various meat proteins like chicken and pork products, across all seasons rather than a replacement of the existing sausage range.



Figure 4: Six week rolling average growth in Mr Beak's sausage range for 2011-12

All states except Western Australia have shown solid sales growth in Figure 4. Figure 5 reflects the reduction in sales in Western Australia which are believed to be due to short shelf life and greater markdowns and dumps. The main sausage category is produced in W.A. and has a longer in-store shelf life due to shorter transport times as compared to Mr Beak's location in NSW close to the Numeat raw material processing.

Recent R&D trials to increase Mr Beak's shelf life are expected to generate the same growth in W.A. sales as experienced in eastern states. Eastern states sales almost doubled in the 2011-12 year with South Australian sales growth at 125% of the previous year volumes in Figure 5.

Based on Beak and Johnston's market access to Woolworths and sales growth performance in the figures below, 6000MT per annum is a believable figure in the next 2 - 3 years.





Figure 5: Change in Mr Beak's market share over the 12 months

d) Equipment - Capital Costs

The equipment cost in Table 15 includes boning stands, mixers and grinders and is itemised in the model. Cost of equipment has been included in the value-adders costs although it was installed at the abattoir.

Maintaining the quality of Numeat product requires product to be processed within 40-60 minutes of slaughter. Processing capacities have been factored with a relatively small equipment installation required to process the targeted 6,000 MT per annum. A summary of costs with estimated return on investment in included in Table 15 below.

	Proces	alue-adding			Retaile	er		WH	OLE SUPP	LY CHAIN		
BENEFITS	\$/kg	\$/hd*	Total industry		\$/kg	\$/hd*	Total	\$/	j/kg	\$/hd*	Total industry	
							industry					
			benefit				benefit				benefit	
Capital cost		50	\$0				\$2,098,750					
Gross return	\$1.69	\$9.29	\$1,806,217		\$3.29	\$18.11	\$3,521,407	\$4	4.98	\$27.41	\$5,327,625	
Total cost	\$0.27	\$1.49	\$289,185		\$0.00	\$0.00	\$0	\$0	0.27	\$1.49	\$289, 185	
Net Benefit	\$1.42	\$7.80	\$1,517,033		\$3.29	\$18.11	\$3,521,407	\$4	4.71	\$25.92	\$5,038,440	
Pay back	Months		Years		Months		Years	Mo	onths		Years	
	16.60		1.38		0.00		0.00	7	7.15		0.60	
Per head net benefit**		\$50.90)			\$118.1	.6			\$169.0	6	
NPV		\$9,042,0	86		\$23,274,445				\$33,834,452			

Table 15: Processor capital investment



4. Appendices

Detailed ex-ante and ex-post comparison

The following table provides a breakdown of the changes in value generated and distributed along the supply chain between the *ex-ante* and *ex-post* CBA reviews. This supports the written explanations provided in section 3 on page 6 of the report.

COST - BENEFIT ANALYSIS OF NUMEAT	Ex-Ante CBA (6000 MT Year 3 Forecast)						Ex-Post CBA (2012 - 1000 MT)							Ex-Post CBA (6000 MT per Ex-Ante)					
Original Ex-Ante		W	HOL	.E SUPPL\	Y CH	AIN		W	HOL	E SUPPL	(CH/	AIN		W	HOI	.E SUPPL	(СН	AIN	
	Hot	t/Cold?				Hot	Но	t/Cold?				Hot	Но	t/Cold?				Hot	
BENEFITS		\$/kg		\$/hd	Т	otal plant		\$/kg		\$/hd	Т	otal plant		\$/kg		\$/hd	Т	Total plant	
						benefit						benefit						benefit	
Reduced Labour Cost	\$	0.03	\$	0.94	\$	182,400	\$	0.02	\$	0.10	\$	19,574	\$	0.02	\$	0.56	\$	109,762	
Reduced Working Capital	\$	0.007	\$	0.253	\$	49,087	\$	0.001	\$	0.043	\$	8,441	\$	0.007	\$	0.243	\$	47,334	
Numeat Price Premium - Increase Margin	\$	5.38	\$	165.98	\$	32,266,094	\$	4.92	\$	27.07	\$	5,261,874	\$	4.93	\$	152.26	\$	29,598,800	
Remaining hot boned product (Price increase)	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
Reduced Chiller Shrink	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
Increased yield (Hot boning in Cold plant)	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
Boning efficiency (Hot bone in Cold plant)	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
Increased capacity - reduce fixed cost/kg	\$	0.17	\$	5.09	\$	990,356	\$	0.04	\$	0.19	\$	37,736	\$	0.17	\$	5.09	\$	990,356	
Increased Market Share - Profit Margin	\$	0.22	\$	-	\$	-	\$	0.22	\$	-	\$	-	\$	0.22	\$	-	\$	-	
Longer Shelf Life - Less Markdowns	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
EX-ANTE Processing Benefit	\$	5.58	\$	172.26	\$	33,487,937	\$	4.98	\$	27.41	\$	5,327,625	\$	5.12	\$	158.16	\$	30,746,251	
COSTS	:	\$/kg			Tot	al plant Cost		\$/kg			Tota	al plant Cost		\$/kg			Tot	al plant Cost	
Capital Cost for Boning Equipment	\$	0.01	\$	0.35	\$	68,068	\$	0.27	\$	1.49	\$	289,185	\$	0.05	\$	1.49	\$	289,185	
EX-ANTE Total cost	\$	0.01	\$	0.35	\$	68,068	\$	0.27	\$	1.49	\$	289,185	\$	0.05	\$	1.49	\$	289,185	
EX-ANTE Total net \$ benefit	Ś	5.57	Ś	171.91	Ś	33,419,869	Ś	4.71	Ś	25.92	Ś	5.038.440	Ś	5.08	Ś	156.67	\$	30.457.067	

Table 16: Summarised supply chain benefit for *ex-ante* and *ex-post* CBA's



Table 17: Benefits summary for each supply chain sector

		COST - I	BENEFIT ANALYS	SIS OF NUM	EAT							
Original Ex-Ante	Proces	sing and V	alue-adding		Retail	er	WHOLE SUPPLY CHAIN					
					1		Hot,	/Cold?	Hot			
BENEFITS	\$/kg	\$/hd	Total plant	\$/kg	\$/hd	Total plant	\$/kg	\$/hd	Total plant			
Reduced Labour Cost	\$ 0.03	\$ 0.94	s 182.400			benefit	\$ 0.03	\$ 0.94	5 182 400			
Reduced Working Capital	\$ 0.03	\$ 0.54	\$ 49.087	с	е с	5 5	\$ 0.03	\$ 0.34 \$ 0.25	\$ <u>49</u> 087			
Numeat Price Premium - Increase Margin	\$ 2.95	\$ 91.09	\$ 17.707.432	\$ 2.43	\$ 74.89	\$ 14.558.662	\$ 5.38	\$ 165.98	\$ 32.266.094			
Remaining hot boned product (Price increase	\$ -	\$ -	\$ -	\$	\$	\$	\$ -	\$ -	\$ -			
Reduced Chiller Shrink	\$ -	\$ -	\$-	\$	\$	\$	\$ -	\$-	\$-			
Increased yield (Hot boning in Cold plant)	\$	\$	\$	\$	\$	5	\$ -	\$ -	\$-			
Boning efficiency (Hot bone in Cold plant)	\$	ş	\$	\$	5 -	\$	\$ -	\$ -	\$-			
Increased capacity - reduce fixed cost/kg	\$ 0.17	\$ 5.09	\$ 990,356	\$	<u>s</u> .	5	\$ 0.17	\$ 5.09	\$ 990,356			
Increased Market Share - Profit Margin	\$ 0.22	ş -	ş -	S	\$	S	\$ 0.22	Ş -	Ş -			
Longer Shelf Life - Less Markdowns	â 2.45	÷ 07 07	<u> </u>	Ş -	Ş -	Ş -	Ş -	Ş -	Ş -			
	\$ 3.15 ¢/kg	\$ 97.37	\$ 18,929,275	\$ 2.43	\$ 74.89	3 14,558,002	\$ 5.58	\$ 1/2.20	5 33,487,937			
0313	ο, κg	şynu	henefit	, у/ кg	ə/nu	benefit	, ул кg	ş/nu	benefit			
Capital Cost for Boning Equipment	\$ 0.01	\$ 0.35	\$ 68,068	5	\$	\$	\$ 0.01	\$ 0.35	\$ 68,068			
EX-ANTE Total cost	\$ 0.01	\$ 0.35	\$ 68,068	\$ -	\$-	\$-	\$ 0.01	\$ 0.35	\$ 68,068			
EX-ANTE Total net \$ benefit	\$ 3.14	\$ 96.99	\$ 18,854,319	\$ 2.43	\$ 74.89	\$ 14,558,662	\$ 5.57	\$ 171.91	\$ 33,419,869			
Ex-Post CBA - Current Active Model	Va	lue-add Pr	ocessor		Retail	er	W	HOLE SUPPL	Y CHAIN			
DENERITE	¢/lue	ć/h.d	Total alout	ć/lur	ć /h al	Total alant	Hot,	/Cold?	Hot			
BENEFITS	Ş/ Kg	\$/na	lotal plant	Ş/Kg	\$/na	lotal plant	Ş/Kg	ş/na	lotal plant			
Reduced Labour Cost	\$ 0.02	\$ 0.10	\$ 19.574				\$ 0.02	\$ 0.10	\$ 19.574			
Reduced Working Capital	\$ 0.001	\$ 0.043	\$ 8.441	Ś	ς	s.	\$ 0.02	\$ 0.04	\$ <u>8,441</u>			
Numeat Price Premium - Increase Margin	\$ 1.63	\$ 8.95	\$ 1.740.466	\$ 3.29	\$ 18.11	\$ 3.521.407	\$ 4.92	\$ 27.07	\$ 5.261.874			
Remaining hot boned product (Price increase)	\$ -	\$ -	\$ -	\$ -	\$	\$	\$ -	\$ -	\$ -			
Reduced Chiller Shrink	\$ -	\$-	\$-	\$	\$	S	\$ -	\$-	\$-			
Increased yield (Hot boning in Cold plant)	\$	\$	\$	<u>\$</u>	\$	5	\$ -	\$ -	\$-			
Boning efficiency (Hot bone in Cold plant)	S	\$	\$	\$	\$ ···	\$	\$ -	\$ -	\$ -			
Increased capacity - reduce fixed cost/kg	\$ 0.04	\$ 0.19	\$ 37,736	<u>s</u>	\$	<u>\$</u>	\$ 0.04	\$ 0.19	\$ 37,736			
Increased Market Share - Profit Margin	Ş 0.22	Ş -	ş -	5	\$ ···	5	\$ 0.22	ş -	Ş -			
Longer Shelf Life - Less Markdowns	\$		\$ 	Ş -	Ş -	Ş -	Ş -	Ş -	Ş -			
EX-POST (2012) Total Processing Benefit	\$ 1.68	\$ 9.29	\$ 1,806,217	\$ 3.29	\$ 18.11	\$ 3,521,407	\$ 4.98	\$ 27.41	\$ 5,327,625			
0313	ə/ Kg	şynu	benefit	, э/ кg	ə/nu	benefit	, ул кg	ş/nu	benefit			
Capital Cost for Boning Equipment	\$ 0.27	\$ 1.49	\$ 289,185	\$ · ·	\$ · · ·	\$	\$ 0.27	\$ 1.49	\$ 289,185			
EX-POST (2012) Total cost	\$ 0.27	\$ 1.32	\$ 256,971	\$ -	\$ -	\$-	\$ 0.27	\$ 1.49	\$ 289,185			
EX-POST (2012) Total net \$ benefit	\$ 1.41	\$ 7.77	\$ 1,509,886	\$ 3.29	\$ 18.11	\$ 3,521,407	\$ 4.71	\$ 25.92	\$ 5,038,440			
Ex-Post with 6000001	Va	lue-add Pr	ocessor		Retail	er	W	HOLE SUPPL	Y CHAIN			
BENEFITS	\$/kg	\$/hd	Total plant	\$/kg	\$/hd	Total plant	Ś/kg	\$/hd	Total plant			
	Ŷ/ \\B	φη ria	benefit	Y/ 11B	<i>\$</i> 7110	benefit	¥/ 118	φ <i>γ</i> πα	benefit			
Reduced Labour Cost	\$ 0.02	\$ 0.56	\$ 109,762	\$	\$	\$	\$ 0.02	\$ 0.56	\$ 109,762			
Reduced Working Capital	\$ 0.007	\$ 0.243	\$ 47,334	\$	ş	S	\$ 0.01	\$ 0.24	\$ 47,334			
Numeat Price Premium - Increase Margin	\$ 1.64	\$ 50.68	\$ 9,852,590	\$ 3.29	\$101.58	\$ 19,746,210	\$ 4.93	\$ 152.26	\$ 29,598,800			
Remaining hot boned product (Price increase	\$ -	\$ -	\$-	<u> </u>	\$	\$	\$ -	\$ -	\$-			
Reduced Chiller Shrink	\$ -	\$ -	\$ -	\$	\$	\$	\$ -	\$ -	\$ -			
Increased yield (Hot boning in Cold plant)	<u> </u>	5	\$	5	\$	\$	Ş -	ş -	Ş -			
Boning efficiency (Hot bone in Cold plant)	\$ 0.17	\$ E 00	\$ 000 254	3	3	2	\$ - \$ 0.17	- ς ς ε.οο	> - \$ 000 2F4			
Increased Market Share - Profit Margin	\$ 0.17	\$ 5.05	\$ 330,330		2 4		\$ 0.17	\$ 5.03	\$ 550,330			
Longer Shelf Life - Less Markdowns	\$ 0.22	s -	y - S	Ś-	Ś-	Ś -	\$ -	\$ -	ş -			
EX-POST (6000 MT) Total Processing Repetit	\$ 1.83	\$ 56.58	\$ 11,000,042	\$ 3.29	\$ 101.58	\$ 19,746,210	\$ 5.12	\$ 158.16	\$ 30,746,251			
COSTS	\$/kg	\$/hd	Total plant	\$/kg	\$/hd	Total plant	Ś/kg	\$/hd	Total plant			
	איי ויץ	ç, na	benefit	97 12	ç, nu	benefit	Y/ 15	ç, nu	benefit			
Capital Cost for Boning Equipment	\$ 0.05	\$ 1.49	\$ 289,185	\$	\$	\$	\$ 0.05	\$ 1.49	\$ 289,185			
EX-POST (6000 MT) Total cost	\$ 0.05	\$ 1.32	\$ 256,971	\$ -	\$ -	\$-	\$ 0.05	\$ 1.49	\$ 289,185			
EX-POST (6000 MT) Total net \$ benefit	\$ 1.78	\$ 55.06	\$ 10,704,214	\$ 3.29	\$ 101.58	\$ 19,746,210	\$ 5.08	\$ 156.67	\$ 30,457,067			

(Note - abattoir benefit is either hot or cold boned. In this case Cold boned benefits are NOT included in the "Whole Supply Chain" total)







Figure 6: Mr Beak's Queensland sales 2011-12



Figure 7: Mr Beak's New South Wales sales 2011-12





Figure 8: Mr Beak's South Australian sales 2011-12



Figure 9: Mr Beak's Victorian sales 2011-12





Figure 10: Mr Beak's Western Australian sales 2011-12

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