

## final report

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# Investigation of reuse of boning room effluent streams

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## Contents

Section		Page
1	Boning Room Effluent Reuse3	
1.1 1.2 1.3	Description of the project	
2	Cost savings generated8	
3	Lessons learnt from the project8	
4	Next steps8	

## 1 Boning Room Effluent Reuse

#### **1.1 Description of the project**

Current best practice in water usage for medium to large integrated export meat processing plants is 5 - 7 kL water/tonne HSCW. It is challenging to further reduce water usage, and involved considerable trials and costs.

This project seeks to directly involve processors by funding water reduction projects involving novel approaches for reducing water consumption and which are widely applicable across the industry.

The future of the processing sector is contingent on understanding, evaluating and implementing water sustainability programs if current water shortage and discharge regulations are maintained at their current restrictive levels or increase. A review of the effluent streams generated from the boning room was conducted and from this streams that were to be considered cleaner were chosen for further testing.

These streams were identified as the following:

- 1. Evaporative coils in the air conditioners: Hot beef, chillers 1 to 11, Hot beef marshalling and cold beef areas
- 2. Boning room sterilisers; pre trim and boning room
- 3. Evaporators at the Variable Retention tunnel
- 4. Refrigeration condensers

Diverting the plumbing to allow these streams to be separated as well as installing a static screen to capture solids was an essential step in allowing the water to be reused.

#### 1.2 Amount of water reused or recycled

The only stream which provided enough clean water to potentially be viable was the water from the boning room sterilisers.

The estimated amount that could be saved was:

20 sterilisers @ 1 litre per minute for 15 hours / day

The result of this was approximately 18,000L / day. This however proved to be financially unviable due to the cost of water presently at the site.

#### 1.3 Monitoring of reuse water quality and quantity

#### <u>Quality</u>

The water quality was assessed and the results were variable. The water from the sterilisers was acceptable as the water was sterilised to 82°C, therefore killing most bacteria.

The results from the other streams identified had very high levels of micro bacteria in them. Chlorination or other treatment would be necessary prior to the water being able to be reused in the designated applications.

#### **Quantity**

Although no metering was installed in this project to determine the quantity of water being recycled., the amount of water saved from the sterilisers was approximated at 18,000 L per day.

#### Location of sterilisers on boning room floor



#### Risk assessment details per AQIS notice 2008/06

BONING ROOM STERILISERS RE-USED WATER RISK ASSESSMENT									
INPUT	HAZARD	POTENTIAL CAUSE	Consequence	Likelihood	Level of Risk	CONTROL MEASURES	ASSESS WITH DECISION TREE?		
Product, Plant/Process,	P - physical, C - chemical, B -			1					
ator Capture From	Boning Room Storilisors	•							
Loto Anto Room	P - None Identified	2 · ,	3		e e		0		
Steriliser	C - None Identified				6 <u>. </u>				
Hot potable water 1 82°C	B – None Identified						No		
Continuous overflow	P – None Identified								
of hot water from	C – None Identified								
entry ante-room steriliser Hot potable water	B. None Identified		1.24		54 L'		No		
Boniog Chain # 1	P - None Identified				10 A		8		
Sterilisers	C - None Identified			- 0					
Hot potable water 82°C	B – None Identified						No		
Continuous overflow	P – None Identified				C: 7		4		
of hot water from	C – None Identified								
1sterilisers Hot potable water 82°C	B. None Identified						No		
Boniog Chains # 1.2	P - None Identified								
and 3	C None Identified		12		5 5	-			
hindquarter end sterilisers Hot potable water 82°C	B – None Identified						No		
Continuous overflow	P - None Identified				<u>.</u>		-		
of hot water from	C None Identified				<u>.</u>		-		
and 3 hindquarter end sterilisers Hot potable water	of the second second						54.A		
02.0	B – None Identified						No		
Boning Chains # 1, 2	P – None Identified								
and 3 forequarter end	C – None Identified						-		
sterilisers Hot potable water	D. AND STREEPERS								
Continuous quorflow	B - None Identified						NO		
of hol water from	C - None Identified								
boning chain # 1, 2 and 3 forequarter end sterilisers Hot potable water 82°C	B - None Identified						No		
	INPUI Product, Plant/Process, Procedures, People ator Capture From Steriliser Hot potable water 82°C Continuous overflow of hot water from entry ante-room steriliser Hot potable water 82°C Borning Chain # 1 Sterilisers Hot potable water 82°C Continuous overflow of hot water from borning chain # 1sterilisers Hot potable water 82°C Continuous overflow of hot water from borning chain # 1sterilisers Hot potable water 82°C Borning Chains # 1, 2 and 3 hindquarter end sterilisers Hot potable water 82°C Continuous overflow of hot water from borning chain # 1, 2 and 3 hindquarter end sterilisers Hot potable water 82°C Borning Chains # 1, 2 and 3 forequarter end sterilisers Hot potable water 82°C Continuous overflow of hot water from borning chain # 1, 2 and 3 forequarter end sterilisers Hot potable water 82°C Continuous overflow of hot water from borning chain # 1, 2 and 3 forequarter end sterilisers Hot potable water 82°C Continuous overflow of hot water from borning chain # 1, 2 and 3 forequarter end sterilisers Hot potable water 82°C	INPU1 HAZARD   Product, Plant/Process, Procedures, People P - 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	Pre-trim area							
	sterilisers	and other these seconds						
	Hot potable water	P – None Identified						
	82°C	C None Identified				2		
9	20-2 x5 34	B - None Identified						No
	Continuous overflow	P – None Identified						
	of hot water from pre-	C - None Identified				2		
	trim area sterilisers							
10	Not potable water 82°C	B – None Identified						No
	Dropped area	P – None Identified				1		
	sterilisers	C - None Identified						
	Hot potable water							
11	82ºC	B – None Identified						No
	Continuous overflow	P – None Identified				1		
	of hot water from	C - None Identified						
	dropped side area							
	sterilisers							
40	Hot potable water	D. Name Islambified						
12	82°C	D - None Identified			· · · · · · · · · · · · · · · · · · ·	10 A		NO
		C None Identified		-	-			
	Boning room re-used			1	0	31.		
13	water storage tank	B - None Identified						No
	Transfer boning room	P - None Identified			6			
	re-used stemiser	C None Identified		-				
	floor re-used water							
14	storage tanks	B - None identified						No
		P - None Identified			i.	5		
		C - None Identified		-				
		B Pathogenic Bacteria.	Boning room steriliser water mixed with					
	Slaughter floor re-	Human contact with re-	water re-used from viscera table. Organic		Almost	ERSTRY W	Re-used water stored In 2	
3.63	used water storage	used water while being held	material in water water allows for bacterial	040400000000000000000000000000000000000	certainly	Moderate	enclosed 20,000 It tanks.	0.0880005
15	tanks	in storage tanks.	growth.	Significant	will occur	risk	Restricted access to personnel.	No
		P - None Identified						
		C - None Identified						
		B – Pathogenic Bacteria.						
		Human contact with re-			Almost			
		pumped from storage tanks	Organic material in water contributes to		certainly	Moderate	Re-Used water transferred to	
16	Pump to Lairages	to lairages.	bacterial growth	Significant	will occur	risk	lairages through enclosed pipe.	No
2.44		P - None Identified		3		1100-0030		0.000
		C - None Identified						
		B - Pathogenic Bacteria				5	Work instruction for operators	
		Human contact with re-			Almost		cleaning lairages to ensure	
	Lairages	used water while cleaning	Organic material in water contributes to		certainly	Moderate	human contact with re-used	
17		lairages	bacterial growth	Significant	will occur	risk	water is avoided	No
		P - None Identified						
		C - None Identified			6	8		
		D - Pathogenic Bacteria					The gradient of the floors in all	
		used water while cleaning	Water pooling on tairage floor prior to		Likely In		lairanes is such that waste water	
18	Drain to Save-All	lairages	draining to save-all	Significant	occur	Low risk	continually drains to save-all.	No

## 2 Cost savings generated

As the price of water is currently \$1.10 per KL, cost savings were minimal. At 18,000L of water per day being saved, the costs savings generated would be around \$20/day.

This level of savings is not economically viable.

If other streams identified, (1, 3 and 4) were to be used, a higher savings would be generated however, set up costs would have been high and would have to include infrastructure such as:

- a stand alone chlorination unit and installation
- holding tank(s)
- plumbing and fittings and labour
- pumps

## 3 Lessons learnt from the project

While the project was under-way another potential clean stream was considered, (water from the spray chillers). The amount of water potential to be reused from this stream was not investigated but it was considered that it could be high.

A cost benefit analysis should be undertaken and a small budget for investigation should be allocated prior to engaging the project to assess financial viability.

## 4 Next steps

- 1. Investigate the quantity and quality of water that could be reused from the spray chilling process.
- 2. Undertake a cost benefit analysis for separate valves and plumbing for the water from the spray chillers.
- 3. Investigate where the water would be reused and the requirements from all regulatory bodies for water quality and health.