final report

Project code: A.ENV.0079

Date submitted: June 2010

Date published: March 2011

PUBLISHED BY
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Investigation of reuse of boning room effluent streams

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

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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

Quality

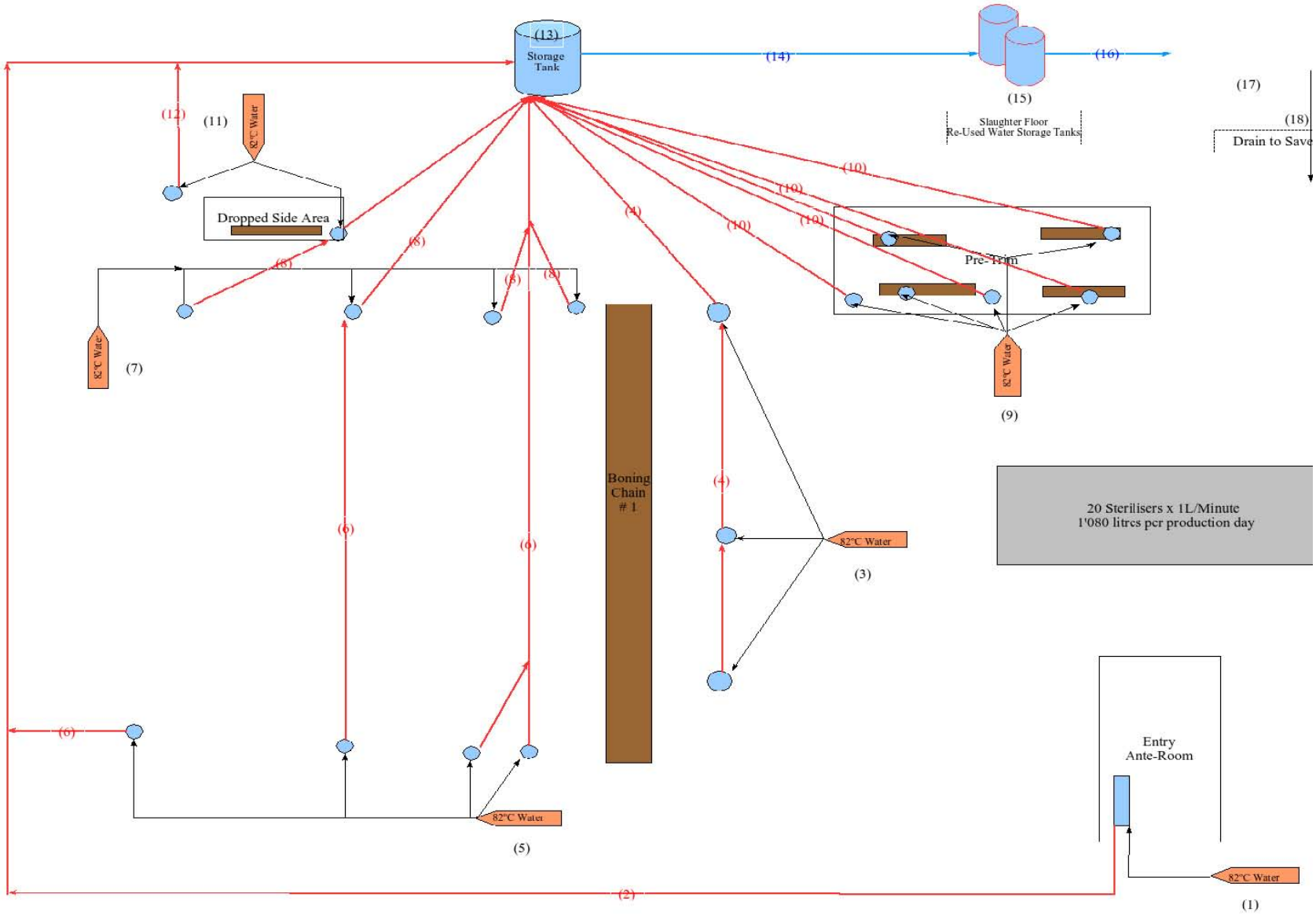
The water quality was assessed and the results were variable. The water from the sterilisers was acceptable as the water was sterilised to 82°C, therefore killing most bacteria.

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 re-used 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, Procedures, People	P – physical, C – chemical, B – biological						
Water Capture From Boning Room Sterilisers								
1	Entry Ante-Room Steriliser Hot potable water 82°C	P – None Identified C – None Identified B – None Identified						No
2	Continuous overflow of hot water from entry ante-room steriliser Hot potable water 82°C	P – None Identified C – None Identified B – None Identified						No
3	Boning Chain # 1 Sterilisers Hot potable water 82°C	P – None Identified C – None Identified B – None Identified						No
4	Continuous overflow of hot water from boning chain # 1sterilisers Hot potable water 82°C	P – None Identified C – None Identified B – None Identified						No
5	Boning Chains # 1, 2 and 3 hindquarter end sterilisers Hot potable water 82°C	P – None Identified C None Identified B – None Identified						No
6	Continuous overflow of hot water from boning chain # 1, 2 and 3 hindquarter end sterilisers Hot potable water 82°C	P – None Identified C None Identified B – None Identified						No
7	Boning Chains # 1, 2 and 3 forequarter end sterilisers Hot potable water 82°C	P – None Identified C – None Identified B – None Identified						No
8	Continuous overflow of hot water from boning chain # 1, 2 and 3 forequarter end sterilisers Hot potable water 82°C	P – None Identified C – None Identified B – None Identified						No

9	Pre-trim area sterilisers Hot potable water 82°C Continuous overflow of hot water from pre-trim area sterilisers Hot potable water 82°C	P – None Identified						
		C None Identified						
		B – None Identified						No
		P – None Identified						
		C – None Identified						
10		B – None Identified						No
11	Dropped area sterilisers Hot potable water 82°C	P – None Identified						
		C – None Identified						
		B – None Identified						No
12	Continuous overflow of hot water from dropped side area sterilisers Hot potable water 82°C	P – None Identified						
		C – None Identified						
		B – None Identified						No
13	Boning room re-used water storage tank	P – None Identified						
		C None Identified						
		B – None Identified						No
14	Transfer boning room re-used steriliser water to slaughter floor re used water storage tanks	P – None Identified						
		C None Identified						
		B – None Identified						No
15	Slaughter floor re-used water storage tanks	P – None Identified						
		C – None Identified						
		B Pathogenic Bacteria. Human contact with re-used water while being held in storage tanks.	Boning room steriliser water mixed with water re-used from viscera table. Organic material in water water allows for bacterial growth.	Significant	Almost certainly will occur	Moderate risk	Re-used water stored in 2 enclosed 20,000 lt tanks. Restricted access to personnel.	No
16	Pump to Lairages	P – None Identified						
		C – None Identified						
		B – Pathogenic Bacteria. Human contact with re-used water while being pumped from storage tanks to lairages.	Organic material in water contributes to bacterial growth	Significant	Almost certainly will occur	Moderate risk	Re-Used water transferred to lairages through enclosed pipe.	No
		P – None Identified						
		C – None Identified						
17	Lairages	B – Pathogenic Bacteria Human contact with re-used water while cleaning lairages	Organic material in water contributes to bacterial growth	Significant	Almost certainly will occur	Moderate risk	Work instruction for operators cleaning lairages to ensure human contact with re-used water is avoided	No
		P – None Identified						
		C – None Identified						
18	Drain to Save-All	B – Pathogenic Bacteria Human contact with re-used water while cleaning lairages	Water pooling on lairage floor prior to draining to save-all	Significant	Likely to occur	Low risk	The gradient of the floors in all lairages is such that waste water 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.