final report

Project code: A.ENV.0081

Date published: March 2011

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PUBLISHED BY
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Visceration table water reuse

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

Contents

1 Visceration Table Water Reuse

1.1 Description of the project

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

The purpose of this project was to trial a process to collect and filter water from the visceration table, for re-use in the cattle yards. Water savings were anticipated to be in excess of 250kL per day.

1.2 Process

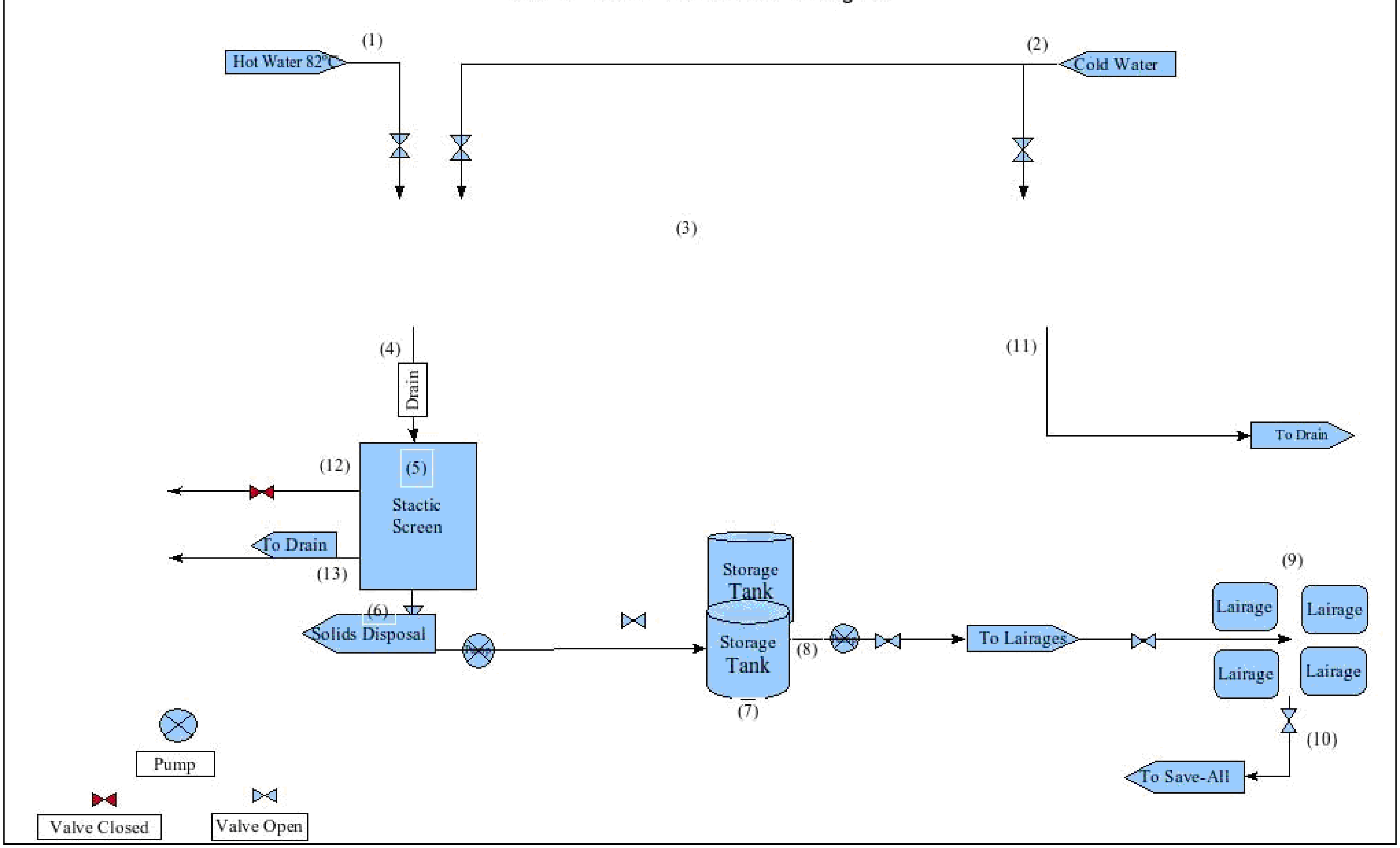
Steriliser water is captured from the clean end of the viscera table. Water is dispensed by the use of sprays across the width of the table at a minimum temperature of 82°C. Cold water is used along the viscera table at both the clean and condemned ends. Water from the clean end is captured by an isolated drain and protected by grating should solids fall on this end.

This water is passed to the static screen to remove any solids which pass through the grating. The underflow of the static screen contains a reservoir of water with all solids removed. The screen pore size is 1mm. Water from the reservoir is pumped into the storage (holding) tank throughout the entire process.

This water in the tanks is then pumped as required to the cattle holding yards to wash the manure via a silt trap and spiral screw (to separate the solids) to the waste water treatment system.

The next page shows a diagram of this process.

Viscera Table Re-Used Water Diagram



1.3 Amount of water reused or recycled

The amount of water recycled was just over 1,000 KL per week. This figure was based on a metered flow rate of each spray of 7.2L/minute, over 34 sprays, with a daily use of 15 hours over a 5 day week.

Formula used: 7.2 x 34 x 60 x 15 x 5

1.4 Monitoring of reuse water quality and quantity

Quality
The water quality was monitored by the Quality Assurance manager as requested by the Australian Quarantine Inspection Service (AQIS). The results were not favourable to the project with both sampling conducted at the viscera table and at the end point (from the hose going into the yards). The results from under the table had a lower count of bacteria however was still not to the acceptable level of AQIS, while the test result from the end point where extremely high for AQIS standards.

Quantity
The quantity of water recycled was too high in bacteria to be acceptable to AQIS. However the quantity of water reused was not maximised due to issues arising from 1) poor end use management and 2) human contact issues raised by AQIS.

Poor end use management
The primary factor here was that there was more water captured than could be used in the yards.

Human contact
AQIS put a stop to the reuse of the captured water as the bacteria (E. coli) count was far too high and posed an unacceptable occupational health and safety risk to those operating the end use in the yards.

2 Risk Assessment Details per AQIS notice 2008/06

	INPUT Product, Plant/Process, Procedures, People	HAZARD P = physical, C = chemical, B = biological	POTENTIAL CAUSE	Consequence	Likelihood	Level of Risk	CONTROL MEASURES	ASSESS WITH DECISION TREE?
Water Capture From Viscera table								
	Hot potable water 82°C	P – None Identified						
1		C – None Identified						No
		B – None Identified						
	Cold potable water	P – None Identified						
		C – None Identified						No
2		B – None Identified						
	Viscera table	P – Fats, Tissue, Blood	Some fats, tissue caught in viscera table slats, returning to clean end. Blood removed at sterile end by 82°C and cold wash sprays	Significant	Likely to occur	Low	Viscera table drain covered with strainer to reduce amount of solid material from going down drain	No
		C – None Identified						
3		B – None Identified						
	Drain to static screen	P – Fats, Tissue, Blood	Some smaller particles of fats, tissue bypass strainer over viscera table drain. Blood removed at sterile end by 82°C and cold wash sprays washed down drain.	Significant	Likely to occur	Low	used water passed through static screen to remove particles of fat and tissue.	
		C – None Identified						No
4		B – Pathogenic Bacteria Human contact with used water at clean end of viscera	Used water contaminated with fats, tissue and blood	Significant	Good chance could occur	Low	Used water drained to waste through enclosed pipe immediately after application to viscera table.	
	Static Screen	P – Fats, Tissue, Blood	Some smaller particles of fats, tissue bypass strainer over viscera table drain washed down to static screen. Blood removed at sterile end by 82°C and cold wash sprays washed down to static screen.	Significant	Likely to occur	Low	Static screen removes particles of fat and tissue prior to water being pumped to storage tanks	
		C – None Identified						
5		B – Pathogenic Bacteria. Human contact with re-used water prior to be pumped into storage tanks.	Used water contaminated with fats, tissue and blood	Significant	Unlikely to occur	Very low risk	Re-used water screened into holding tank prior to pumping into storage tanks. Limited access to personnel.	No
	Pump to Storage Tanks	P – None Identified						
		C – None Identified						
6		B – Pathogenic Bacteria. Human contact with re-used water while being pumped into storage tanks.	Organic material in water contributes to bacterial growth	Significant	Almost certainly will occur	Moderate risk	Re-Used water transferred to storage tanks through enclosed pipe	No

Page 6 of 8

		P – None Identified						
		C – None Identified						
7	Storage Tanks	B – Pathogenic Bacteria. Human contact with re-used water while being held in storage tanks.	Organic material in water contributes to 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
		P None Identified						
		C – None Identified						
8	Pump to Lairages	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						
9	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						
10	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
		P – Paunch material discharge from viscera table	Paunch material waste captured in drain	Minor	Likely to occur	Low risk	Human contact with re-used water avoided by draining through enclosed pipes.	
		C – None Identified						
11	Drain from Condemn End of Viscera Table	B – Pathogenic Bacteria Human contact with re-used water draining from viscera table. P – None Identified	Contamination from paunch material.	Minor	Likely to occur	Low risk	Human contact with re-used water avoided by draining through enclosed pipes.	No
		C – None Identified						
12	Drain from Static Screen Tank	B – Pathogenic Bacteria Human contact with re-used water draining from static screen tank.	Organic material in water contributes to bacterial growth	Significant	Likely to occur	Low risk	Human contact with re-used water avoided by draining through enclosed pipes.	No
		P – Fat and Tissue	Some fats, tissue caught in viscera table slats, returning to clean end.	Minor	Likely to occur	Low risk	Human contact with waste material avoided by the use of forklift trucks to dispose of.	
		C None Identified						
13	Solids Disposal from Static Screen	B – Pathogenic Bacteria Human contact with waste material.	Waste material screened off into a condemn bin.	Minor	Likely to occur	Low risk	Human contact with waste material avoided by the use of forklift trucks to dispose of.	No

3 Cost savings generated

The cost savings this project generated were estimated in the way of $1,200 per week. This is based on the formula outlined above in section 1.3 and the current cost of water on-site.

4 Lessons learnt from the project

4.1 Timeframe

A project of this nature on an older plant, a longer period of time is required to identify and problem solve some of the contributing factors to the high micro bacteria count.

4.2 Appropriateness of end use

When devising a project scope, adequately assess the end use characteristics required. Yards in this case were not using enough of water that was being captured and therefore there was water being wasted. Due to the water not being used at the designated rate (ie using all the water saved each day) the bacteria counts were able to increase at extremely high rates, and thus making the water unacceptable from an OH&S point of view.

4.3 Regulations

Prior to the initiation of such projects a risk style matrix should be developed to determine what regulations and governing bodies requirements are acceptable such as AQIS, OH&S, EPA and QA so that the most appropriate end use application is chosen.

5 Potential next steps

1. Investigate the viability of chlorinating the water to achieve a higher and usable quality. To effectively chlorinate the water to a usable quality, the temperature must be reduced from the 50°C-60°C range it currently stores at to approximately 30°C or lower. Achieving this reduction in temperature should be investigated further.
2. Increasing testing points along the flow line to isolate potential areas of bacteria colonisation. The temperature the water is stored at provides optimum conditions for micro breeding.
3. Increase holding tank capacity so that the full day's water can be captured.
4. Ensure that the balance of the tank is discharged daily to minimise the potential for micro bacterial colonisation.
5. Increase uses for reused water in the yards and elsewhere on site.