final report

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First waterless cleaning workshop - Summary

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Approximately 20 - 33% of the total water use in modern meat processing plants is consumed for plant and equipment cleaning, which occurs on a daily basis to ensure food hygiene. Despite the best intentions of management, cleaning is prone to human excess and occurs at hours of the process cycle when management presence is reduced. At this time, when water security can not be guaranteed for the industry, the adoption of drier cleaning systems commensurate with maintaining food safety excellence is an approach that merits investigation.

Following on from findings of the 2008 MLA project ‘Waterless cleaning of meat processing plants’ (A.ENV.0066), an Industry Working Group has been assembled by the Australian Meat Processor Corporation (AMPC) to review the findings of the previous project and propose a roadmap of projects that can capture the benefits of waterless cleaning and overcome the barriers to adoption.

The objectives of this contract were to;

- review the 'Waterless cleaning of meat processing plants' report and become intimately familiar with its findings
- hold a one day strategy workshop in Melbourne in June 2011 to map out a strategy to encourage the industry uptake of waterless cleaning practices and technologies through targeted industry projects.
- capture the recommendations of the working group in regard to the waterless cleaning strategy

The workshop was held at the Holiday Inn, Melbourne Airport, 23rd June 2011. The outcomes of this workshop are the subject of this summary.

Workshop outcomes summary

- Attended by 5 industry representatives, 4 MLA representatives, 1 AMPC representative, Dr Ross Nicol and 2 facilitators.

- The workshop was informed by the *Waterless Cleaning for Meat Plants* report (A.ENV.086) completed in late 2008. The researcher who wrote this report, Dr R Nicol, was present at the workshop to present the latest additions to the previous work.

- The material was discussed in the 4 hierarchial groups outlined in the 2008 report. Twelve topic concepts were outlined for reducing water usage during cleaning and these provided the basis for the workshop discussion.

- Industry representatives voted on the concepts with highest priority for RD&E funding by AMPC and MLA, and then identified as a group, the issues needing to be addressed.

- The five concepts with the highest ranking are listed in order (from highest rank to lowest of the five) and were discussed in detail:
    1. high efficiency belt and tunnel washing systems
    2. mechanical floor scrubbing systems
    3. design for cleanability guide
    4. high(er) pressure washing
    5. cleaning in place (CIP)

- The workshop identified highest priority concepts with best potential benefit-risk profile for the red meat industry. Although limited by the time that was available, further ideas are provided as a basis for developing individual RD&E projects.

Overall waterless cleaning workshop methodology and strategy

- Industry representatives agreed that the main drivers towards waterless cleaning are;

    1. **Water savings** – Water is currently a negligible cost for most Australian meat processors however it is reasonable to assume that the cost of water will rise. Some Queensland sites are charged $12,000 per ML of water over a set yearly limit.
    2. **Energy savings**
    3. **Labour savings** – this is currently the major driver with cleaning labour costly and difficult to retain.

    Although in many cases contract companies are used for plant cleaning, industry representatives felt that any RD&E benefits could be captured by the industry (rather than the contractors).

- Industry recommended the identification of areas that do not require daily cleaning.

- The concept “Monitoring and Targeting” from discussion.
  It was viewed that the application of water monitoring and targeting is not limited by factors that should be addressed by RD&E. However, it is important that industry is informed on how to and where to monitor water so that data is representative and consistent.

- Industry representatives were requested to vote on the areas that they felt would most benefit from MLA research funding. Each industry representative was given 14 votes.

- The AMPC/MLA group was given 14 voting points as a collective.

- The voting results are summarised in Table 1.

- The five highest scoring topic areas were discussed in detail.

Overall feeling about the workshop

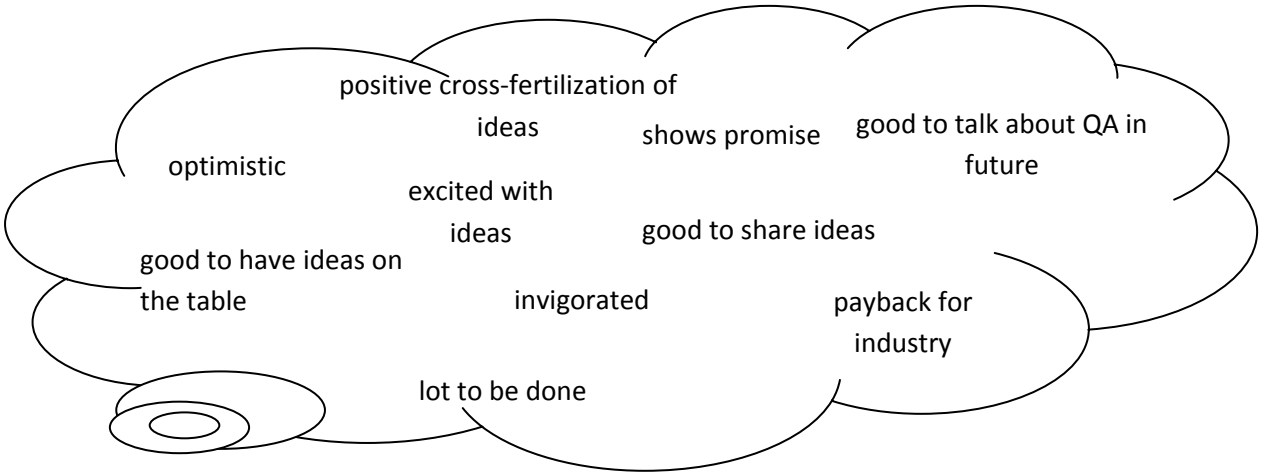


Table 1. Outcome of voting across the Cleaning Concepts

Topic Area	Industry Votes	MLA/AMPC Votes
Reduce the NEED for cleaning		
• Design for cleanability	9	9
• Floor systems	6	0
• Advanced surface finishes	0	0
Reduce the ROLE of water		
• Vacuum collection and transfer systems	7	4
• Mechanical floor scrubbing systems	11	0
• Alternative cleaning fluids	5	0
• Ultrasonic cleaning systems	2	0
• Novel sanitation systems	1	0
Increase the EFFICIENCY of water use		
• High(er) pressure washing systems	8	1
• High efficiency belt and tunnel washing systems	13	0
• Monitoring and targeting water use (see discussion)	0	0
RECYCLE and REUSE		
• **Automated cleaning and clean in place (CIP) systems**	8	0

Discussion of individual cleaning concepts

Concept 1: High efficiency belt and tunnel washing systems

Current use

- Some meat processing facilities have had belt washing systems in place but they are no longer used routinely. Reasons for this included;
    - Units were not high efficiency and still use a lot of water and energy;
    - AQIS requirements regarding belt washers were onerous and variable between facilities and this was a barrier to adoption.
- The pig industry makes much wider use of totes to move product and uses tunnel washers to clean the totes. This was reported to work well.

Scope for future RD&E

- Conveyor belt washing
    - Boning room
    - Slaughter floor
- Tunnel washers could be used to clean all sorts of discrete items, eg. floor mats, cutting boards, etc.
- A focus on the Viscera table washing/sterilisation – currently use a lot of 82^{o}C water for cleaning.

Desired RD&E Outcomes

- Reduction in labour – cleaning throughout day may reduce end of day cleaning labour
- Reduction in water use
- Higher efficiency cleaning on the viscera table through better design
- All industry representatives were interested in belt washing but only 2 were also interested in tunnel washing.

Other ideas

- Continuous cleaning may aid in reducing microbial build-up during day however this may not be a problem (I Jenson had useful input on this).
- May be better used intermittently rather than continuously to reduce water consumption.
- Combine with mechanical scrubbers or ultrasonics for physical cleaning.
- Combine with ultra violet light for sterilization.
- Combine with reusing water.
- Ergonomics drive the use of belts (rather than discrete tote systems).

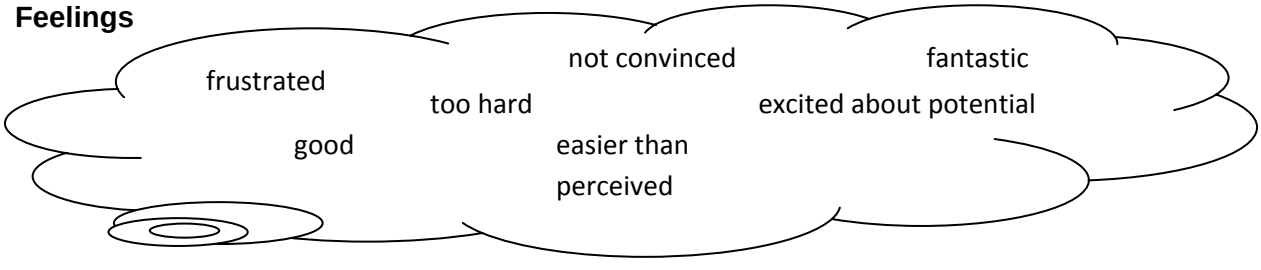
Positives

- Acheivable
- Sustainable
- Reduce contamination
- Saves water, labour and energy

Negatives

- High capital costs
- AQIS regulation perception
- Higher conc, lower volume wastewater
- Belt-specific design required that is complex and expensive & not universally applicable

Feelings



Concept 2: Mechanical floor scrubbing systems

Current use

- Mechanical broom combined with high pressure water

Scope for future RD&E

- Interest in robotic system under carcasses in chiller rooms (both sortation & others);
- Frequency of chiller washing?

Desired RD&E Outcomes

- Clean heavily soiled areas;
- Handle large pieces of solids AND scrub floor
- Reduce chiller cleaning time. Emphasis on chiller cleaning.
- Interest in robotic or automated systems.

Other ideas

- Combine mechanical scrubber with steam sterilizer and vacuum
- Enable to clean floor mats
- Reuse water
- Produce intelligent robot scrubbers that “remember” where they have been.
- Introduce in a staged approach
    1. Human operated
    2. Robot operated
- Rail cleaning robot.

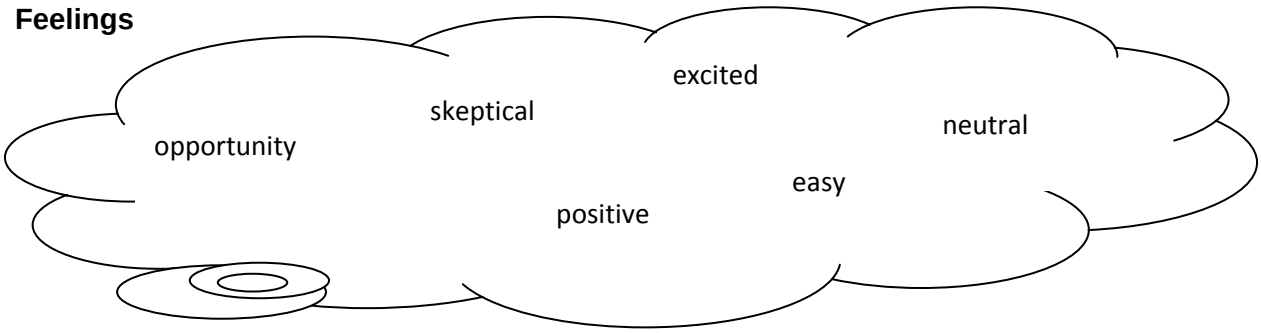
Positives

- Gets to inaccessible places
- High cleaning efficiency
- Consistent cleaning
- Increase production efficiency (eg. enabling chiller cleaning while emptying)

Negatives

- Requires cultural change in cleaning
- Expensive to buy
- Difficult to operate in presence of clutter
- Meat processing solids are difficult to clean eg. Fats smear rather than clean
- Expensive to maintain

Feelings



Concept 3: Design for Cleanability Guide

Current use

- Other industries have developed equipment cleanability guides, eg the EHEDG guides for food processing equipment and facilities.

Scope for future RD&E

- Focus on cleanability of equipment and facilities but resist attempts to broaden the scope to design of facilities in general.

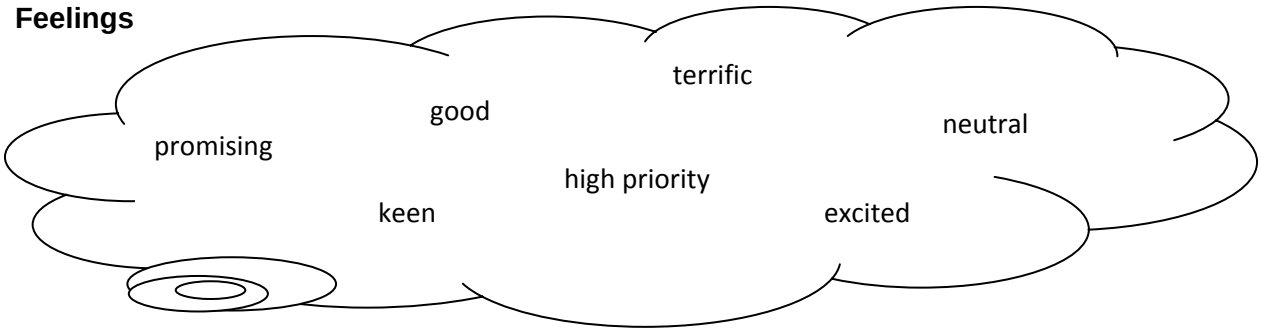
Desired RD&E Outcomes

- Assist in design of equipment and facilities by both in-house & external suppliers/vendors
- Assist with the development of cleaning techniques
- Provide cleanability checklist for equipment and facility designers
- Document existing knowledge
- Define cleanability.
- Involve AQIS in document construction to ensure their approval of future design.

Negatives

- Risk guide becomes prescriptive
- Risk guide becomes vague
- Difficult to fit all applications

Feelings



Concept 4: High(er) Pressure washing

Current use

- Individual units primarily for water saving
- Some companies have satellite units off a centralised pressure water system
- Many companies already using higher pressure systems

Scope for future RD&E

- Group didn't see need for technical research
- Benefits lie in better spread of knowledge/case studies regarding successful implementation
- Emphasis on labour saving applications

Desired RD&E Outcomes

- Reduced water use – not interested in "just replacing a hose".
- Reduced labour
- Documented success stories (perhaps Supplier nominated)
- Demonstration of innovative uses especially those involving reduced labour
- Education

Positives

- Labour saving

Negatives

- Cleaners have individual preferences – culture issues

Concept 5: Cleaning in Place (CIP)

Current use

- Very little application of CIP within meat processing sector.

Scope for future RD&E

- Reuse of water. A good example of this is on the visceration table where water is continuously running. This could be reused in the offal wash area, or through counter-current clean wash/dirty wash sequence.
- CIP for weekly chiller wash. This is a relatively empty space that could be easily washed by built in sprayers and the water collected for reuse.
- CIP whole rooms
- CIP of difficult to access areas such as drains.
- CIP of at-line robots

Desired Outcomes

- Time prevented discussion on this.

Positives

- Water savings
- Energy savings
- Labour savings
- Chemical recovery
- More consistent clean

Negatives

- Unwanted water penetration leading to damage.
- Expensive to retrofit
- AQIS barriers
- Lack of control.