



## NEWSFLASH WATER SAVING GUIDELINES FOR RED MEAT ABATTOIRS IN SA

T: (012) 349-1238/9

F: (012) 349-1240

www.rmaa.co.za

2018.03.20

### BEST PRACTICE IN WATER USE AND WASTE WATER MANAGEMENT<sup>1</sup>

South Africa, being a water scarce country, has to reduce water consumption in all industries, but especially so in the industries which are classified as large water consumers.

Red meat abattoirs are renowned to be large volume water consumers and they therefore generate equally large volumes of wastewater. The wastewater contains high concentrations of waste products, high in chemical oxygen demand (COD) and suspended solids content. Typically, raw blood generates exceptionally high COD levels, while cleaning and carcass washing operations normally account for more than 80% of total water use and wastewater volume. It is possible for red meat abattoirs to adopt a systematic approach to minimising water use and reduce their water and wastewater costs by 15-30%. This best practice analysis describes a range of cost-effective measures to assist companies in reducing costs while cleaning and washing effectively, without compromising hygiene standards. *(Full report available as a separate document)* The ever-increasing cost of potable fresh water supply as well as wastewater treatment cost, increases the pressure on red meat abattoirs to reduce water consumption and wastewater generation. Many abattoirs can significantly improve both process and cleaning operations.

The aim should be to minimize waste generation, and systems should be put in place to:

- Reduce water consumption
- Minimise quantities of waste generated
- Minimise spillages
- Remove solids before entering waste streams
- Institute dry-cleaning regimes prior to wash-down

Strategies should therefore be instituted to facilitate cleaner operational procedures, minimize and/or prevent waste generation, properly dispose of waste, recycle waste or institute waste beneficiation systems, which should include:

- Effective management of water utilisation and the accompanying generation of wastewater.
- Implementation of system improvements:
- Livestock transportation and lairage arrangements
- Process operations
- Cleaning regime
- Wastewater pre-treatment
- Water Conservation

**Storm water** contaminated by organic materials should be collected in storage reservoirs (dams) for re-use as irrigation supply.

**Lairages, livestock receiving areas, wastewater treatment plants and all processing areas** should be roofed over to minimize the volume of wastewater.

Clean storm water should be separated from contaminated water/wastewater.

**High water pressure with adequately designed spray nozzles** should be utilized, as water conservation measures.

**Process areas** should be permanently paved and adequately sloped to facilitate proper drainage to sewerage systems, and avoid contamination of storm water. Red Meat Abattoirs can affect significant savings by managing their water use and wastewater generation.

Water and wastewater charges are significant expenditures to red meat abattoirs. Due to the scarcity of water in South Africa, these costs are increasing at an alarming rate. Wastewater charges will be increasing still further as local authorities seek to recoup the massive investment required to upgrade their wastewater treatment plants to meet wastewater standards.

<sup>1</sup>NATSURV 7 Water and Wastewater Management in the Red Meat Abattoir Industry (Edition 2)

Jerrard Müller

Report to the Water Research Commission by J R Müller & Associates in association with the Red Meat Abattoir Association

Cleaning and carcass washing operations typically utilise more than 80% of total water use and wastewater volume.

---

### Minimisation of water use and wastewater generation

Water use in red meat abattoirs is intrinsically high because of the need to meet stringent hygiene requirements. Not disregarding hygiene requirements, many companies waste (and pay) for more water than is necessarily required.

Excessive usage can generally be attributed to:

- Lack of awareness of the volumes utilised and discharged.
- A wide margin of safety to ascertain minimum hygiene requirements being achieved – this is compounded by a lack of awareness of what can be achieved without compromising hygiene. Cleansing and carcass washing can be performed in more efficient, cost-effective and environmentally responsible ways. General hygiene requirements should be taken into consideration, i.e. regulations require potable water to be utilised in abattoir processing, and for slaughter equipment to be sterilised utilising water at 82°C. In this instance, high pressure low volume sprays can be utilised for general cleaning of lairage areas, they may not be used in meat processing areas where meat is present, due to the risk of atomised water droplets spreading contamination. The use of recycled wastewater is not permitted in process areas.

Adopting systematic approaches in red meat abattoirs, minimising water consumption can considerably reduce the water and wastewater bills at little or no cost to business. By utilizing appropriate equipment, further water and wastewater cost savings can easily be achieved. Red meat abattoirs are guided in ways to use less water and thereby generating less wastewater. When utilized as a management tool, improved management of water, cleaning chemicals and wastewater will result. Waste reduction should start at source, as this is the most effective approach in the reduction of costs.

### General recommendations to abattoirs

The following recommendations are made to South African red meat abattoirs. It should be noted that some aspects are reliant on some relaxation of certain regulatory requirements and need to be implemented in collaboration with the respective provinces. Every effort should also be made to not impact negatively on the meat safety risk associated with the operations in the abattoir.

1. General prudent use of water and if possible provision for storage on the premises for at least one day of slaughter.
2. Water saving devices on all open hoses
3. Redirection of water from hand wash basins and sterilizers directly on the slaughter and process floor instead of drainage directly into the drainage system. This water should be used with squeezes for continuous cleaning. This water outlet should be directly on the floor without splashing.
4. The continuous use of water in the bleeding and slaughter area for continuous cleaning is unnecessary and can be provided intermittently with a squeeze used for most of the time. The presence of blood in limited amounts and without accumulation does not necessarily reflect bad or unacceptable hygiene practices. Structural issues with blood collection at some facilities require an abnormal amount of dilution of blood to ensure flow and drainage. An alternative redirection of grey water (eg from hand wash basin and sterilizer) should be considered.
5. Water usage during the final wash of carcasses, red offal and heads should be restricted to the absolute minimum. The washing of carcasses should be limited to the removal of bone splints and excessive blood only) The Association has also requested DAFF to consider approval of decontamination options of carcasses which might reduce the use of water in this field even further.
6. The use of pooled water in the final rinsing of rough offal on the condition that this water be replaced intermittently as determined in the operating procedure.
7. Prudent use of water in the washing of pig carcasses during the slaughter procedure.
8. Dry cleaning of (brooms) of lairages prior to washing (if surface allows) and rudimentary washing of lairages if the use of the lairages will be for a fairly short period during the day only.
9. The collection and treatment of water from the abattoir and the use of grey water for the cleaning of lairages and trucks.
10. Reducing the water volumes in cisterns of toilets.
11. Review of the end of day cleaning program to ensure the use of water to the absolute minimum
12. A review of documentation relating to above as per section III of the Red Meat Regulations to ensure active management and verification of the water saving measures as applied.

**These are only some recommendations and we welcome further practical solutions from abattoirs to share with the rest of the industry.**

## Waste water treatment and water recovery options<sup>2</sup>

Wastewater management benefits significantly from internal policies and creative interventions. However, more often than not a waste stream remains which requires treatment or appropriate management. With continuing pressure on water availability (both quantity and quality), appropriate wastewater management is becoming more focused on water recovery from wastewater, reducing residual waste disposal requirements and optimising water use. Water recovery has historically been considered expensive however with the declining water security experienced across South Africa and the rapidly escalating cost of water and wastewater the business case for water recovery is becoming significantly more attractive.

---

There are three main wastewater types, namely:

- Saline/brackish – Naturally occurring (certain groundwater and sea water) or produced industrially. Contaminants are predominantly in solution.
- Wastewater with high Chemical Oxygen Demands (COD) for neutralisation – organic contaminants in suspension or in dissolved phase.
- Acidic with metal contamination - Naturally occurring (certain groundwater) or produced industrially. Contaminants are predominantly in solution.

---

When considering similar flowrates, treatment and water recovery solutions for COD based wastewater streams often require higher capex allocation than the other wastewater types.

The cost difference is generally due to its complexity (different contaminant phases) of the treatment plants and the requirement for a combination of treatment approaches to achieve good water quality. However, COD based wastewater can offer opportunities for biogas generation and also requires less energy input whilst generating less additional quantities of harmful secondary waste that require additional management.

Wastewater streams associated with the red meat abattoir industry contains elevated COD concentrations and often has relatively large flowrates. In general, there are four main contaminant categories that require treatment attention:

- Solids material such as pieces of meat, fat, paunch contents and manure.
- Suspended matter such as fine particles of protein, blood, fat, paunch contents and manure. Also referred to as insoluble COD.
- Soluble COD which comprises of dissolved protein, blood, fat, paunch contents manure.
- Nutrients which generally comprises of nitrogen and phosphorus-based compounds.

---

In terms of wastewater treatment and water recovery options for red meat abattoirs,

selected technologies can be used to address key components of the wastewater, or a combination of technologies to achieve superior water quality targets. Technologies generally used with the red meat abattoir effluent sector includes the following in consecutive order:

- Mechanical screen – removal of large solids.
- Dissolved Air Flotation (DAF) – removal of suspended solids (insoluble COD)
- Anaerobic Digestion – removal of soluble COD.
- Activated sludge – removal of nutrient and soluble COD.
- Ultra-Filtration – polishing of water for potable use.

## Risk assessment of recycling and reuse activities

---

### Hazard identification

The main hazards in the groups are microbiological (pathogens and spoilage organisms), chemical (disinfection by products and hormones) and physical (micro contaminants). The risk levels for chemicals was found to be negligible in other countries (MLA, 2003b), even in worst case scenarios. The predominate risk appear to be associated with microbiological pathogens.

---

<sup>2</sup> Input from Talbot & Talbot (see RMAA website)

# Talbot & Talbot

## Delivering Sustainable Water and Wastewater Solutions



Talbot & Talbot is a water and wastewater engineering and process specialist company with an accredited internal laboratory, delivering strategically aligned and efficient water management solutions across Africa for 28 years.



Our approach to delivering best value for our clients is to ensure that we develop bespoke solutions that address our clients' specific challenges whilst supporting their longer-term strategic drivers.



To achieve this, we draw on our wealth of experience in the fields of:

- Physical separation processes (screening, filtration and flotation).
- Aerobic and anaerobic biological treatment (COD and nutrient neutralisation).
- Waste to biogas generation, biogas harvesting and energy recovery.
- Membrane technologies and water recovery.
- Strategic process and corporate Risk Management.
- Accredited laboratory analyses.



Talbot & Talbot is not bound by specific technologies, but rather will identify and propose the most suitable and robust solution for any particular situation.



### Contact Us Today

 +27 33 346 1444

 [www.talbot.co.za](http://www.talbot.co.za)

 [talbot@talbot.co.za](mailto:talbot@talbot.co.za)

**Talbot &  
Talbot**