



# final report

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## Ozone treatment of wastewater - King Island

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## 1.0 Summary

The purpose of the ozone technology performance trial was to assess the use of the Ozone Safe Food, Inc. water purification technology on waste waters generated from the Tasman Group Services (TGS) beef processing facility located in King Island, Tasmania

The trial's key objective was to determine the capability of the ozonation technology as the primary treatment system for waste waters derived from the TGS abattoir site located at King Island, Tasmania.

The trial also sought to verify the technology's ability to achieve a final treated water quality which meets the emission limits as set out by the Tasmanian Government for the abattoir.

Significant evidence exist that ozonation technology is being successfully used as a waste water disinfectant in various industrial processes world wide. During the King Island trial the Aquaclean System Model 60 and Vortex Mixing System effectively neutralised odours and improved the clarity of treated waste waters. However, the ozonation technology failed to have any impact on critical issues such as BOD and TSS volumes and coilform counts.

Ozone Safe Food Pty Ltd has stated that the ozonation technology failed to achieve the required outcomes due the high temperatures of the waste waters being treated (temperatures above 25C impede the generation of sufficient ozone).

## 2.0 Performance Claim

The Ozone Safe Food Pty Ltd Aquaclean System Model 60 and Vortex Mixing System™ claims to generate ozone as an oxidizer, which is:

- 51 times as powerful as chlorine, the oxidizer most commonly used by most food processors.
- 3,000 times as fast at killing bacteria and other microbes.
- Is effective as a disinfectant at relatively low concentrations.
- Does not leave toxic by-products similar to those related to chlorination.

## 3.0 Ozonation Technology Description

'3 in 1' Pilot Plant using Vortex Mixing System™ and Aquaclean System. The ozonation process consists of a simple continuous process of pumping the waste water from the holding tank to the Aquaclean unit and then through to the Vortex mixer until the desired quality of the waste water has been achieved (monitored by sensors located at the front of the Aquaclean unit).

3.1 Technology components:

- a) Aquaclean System Model 60: creates chemical free, ozonated water.
- b) Vortex Mixing System™: compresses the ozone into microscopic bubbles in the water solution resulting in higher ozone residuals, with less off gas.
- c) 900lt stainless steel test water holding tank.

## 4.0 Trial Location

The Aqua clean System Model 60 and Vortex Mixing System™ was pilot tested at the Tasman Group Services (TGS) beef processing facility in King Island, Tasmania.

The only waste water treatment process currently in use at the TGS site consists of an on-site screening tank where solids are removed prior to waste waters being diverted to final discharge point (drain leading to natural waterway).

## 5.0 Parameters

The quality parameters set for the ozonation technology trial were those as outlined in the Tasmanian Government publication 'Emission Limit Guidelines: Sewage Treatment Plants DPIWE, June 2001' (Table 1).

Plant Type	BOD mg/L	NFR mg/L	Total N mg/L	Total P mg/L
<b>Activated Sludge Plant</b>				
EA+BNR	15	20	10	5
Ea + P + CPR	10	15	5	<1
Ea + P+ BPR	10	15	5	5
EA + P + CPR + F	5	5	5	0.5
<b>Hybrid Plant</b>				
TF + P + EA + CPR	10	15	5	1
CAS + EA + P + BPR	10	15	5	5

Table 1 - 'Emission Limit Guidelines: Sewage Treatment Plants DPIWE, June 2001'

EA: Extended Aeration  
 BND: Biological Nutrient Removal  
 P: Ponds  
 F: Filtration  
 BPR: Bio P Removal  
 CPR: Chemical P Removal  
 TF: Trickling Filters  
 CAS: Conventional Activated Sludge

## 6.0 Analytical Results

A total of 9 treated waste water samples were collected during the 2 day trial. All samples were forwarded to the Water Ecoscience, NATA accredited laboratories in Melbourne for analysis. Table 2 summarises the analytical results.

Sample	BOD mg/L	NFR mg/L	Total N mg/L	Total P mg/L
1	360	420	180	6.2
2	480	550	160	7.4
3	490	520	160	6.7
4	880	520	160	6.6
5	770	530	140	5.2
6	500	350	89	3.8
7	430	290	77	3.2
8	510	220	76	4.8
9	340	210	68	3

Table 2 – Summary of waste water analytical results.

## 7.0 Difficulties

- Typical ozonation systems are more effective in treating waste waters up to 25C. Waste waters at the King Island facility are between 30C to 35C.
- Very limited technical or scientific research data was available regarding the Aquaclean System Model 60 and Vortex Mixing System.
- Limited professional technical support was available regarding the Aquaclean System Model 60 and Vortex Mixing System.

## 8.0 Conclusion

The pilot study performed at the Tasman Group Services King Island abattoir site with the Aquaclean System Model 60 and Vortex Mixing System yielded an adequate amount of data for analysis.

The Aquaclean System Model 60 and Vortex Mixing System were unsuccessful in treating the prescreened waste water effluent in order to meet the required quality parameters.

This conclusion is based on the analytical results from samples taken of waste waters treated by the ozonation technology.