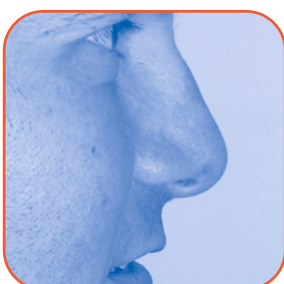


A COMMERCIAL APPLICATION
OF VIROFLOW™ TECHNOLOGY

CASE STUDY: QUEENSLAND
ORGANIC RECYCLING SYSTEMS

“On a scale of ‘0 to 10’ (with 10 being the most objectionable odour), the EPA officer rated the odour generation from the leachate ponds to be ‘0’ (zero), with no detectable odour (after treatment)...”



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PROBLEM

Queensland Organic Recycling Systems (QORS) operates a large-scale composting facility in South-East Queensland. Existing leachate collection ponds were generating large amounts of objectionable odour, primarily due to anaerobic biological activity. The key objective of this commercial application of ViroFlow™ Technology was to:

- (1) chemically treat the leachate ponds to reduce odour generation and improve water clarity immediately; and
- (2) install a permanent system to ensure ongoing odour abatement.

VIROTEC'S TOTAL SOLUTION

The treatment involved the adoption of Virotec's patented ViroFlow™ Technology using proprietary reagents and application methods. The ViroFlow™ Technology treatment was a custom designed, multi-stage treatment applied in four separate stages. Following ViroFlow™ Technology treatment, a series of aerators was used to ensure that the pond water was well oxygenated.

Virotec's ViroFlow™ Technology comprised the following elements:

- > Initial characterisation of the water;
- > Chemical treatment of the contaminated water to remove odour and improve water clarity for recycling;
- > Installation of aeration system;
- > Liaison with regulatory authorities;
- > Environmental Risk Assessment; and
- > Development of a long-term management plan for overall site odour abatement.



Composting windrows at QORS.

>>> CASE STUDY: QUEENSLAND ORGANIC RECYCLING SYSTEMS

BACKGROUND

QORS operates an organic composting facility at Swanbank, Queensland, that involved mixing septic wastes and fats, oils and greases (FOG's) from grease trap wastes with carbon-source amendments such as sawdust. This mixture, when turned over regularly and aerated, forms saleable compost that meets regulatory guidelines.

Due to the nature of the business, there are multiple odour generation points at the facility includes the mixing pads, compost windrows, and leachate ponds. The trade wastes used by QORS leach from the compost heaps or piles. This leachate is collected in one of two leachate ponds which over time decomposes due to anaerobic biological activity and creates an obnoxious odour.

TREATMENT METHODS

Virotec initially treated two leachate ponds, pond No.2 and pond No.3 with capacities of 200kL and 2,000kL respectively. Treatment of the two leachate ponds was achieved using a customised chemical treatment, followed by the installation of a permanent aeration system.

The designed ViroFlow™ Technology chemical treatment comprised of a 4-stage chemical addition as detailed below. Both leachate ponds were subject to identical treatment regimes.

CHEMICAL TREATMENT

The first stage of chemical treatment involved the use of ViroFresh™ reagent A to saponify the fats, oils and greases that were present in abundance on the surface of the ponds. The elimination of these oily compounds ensured that ViroFresh™ reagent B had maximum effectiveness.

The ViroFresh™ reagent A was premixed in a mixing vessel and subsequently sprayed over the surface of the ponds. The chemical effect of this treatment was to raise the pond pH to 9.1. The pH shock had a detrimental effect on the anaerobic biomass in the leachate ponds.

The second stage of chemical treatment used ViroFresh™ reagent B, Virotec's proprietary reagent for the treatment of sewage and wastewaters with similar characteristics. Within ViroFresh™ reagent B, there are several odour abatement mechanisms working concurrently with the net effect of dramatically reducing odour.

ViroFresh™ reagent B can also remove heavy metals that may be present in the leachate from the various trade wastes. The proprietary reagent was premixed in a mixing vessel and subsequently sprayed over the surface of the ponds. The spent reagent was allowed to settle and form a blanket over the bottom of the ponds. The pond pH may increase further after addition of ViroFresh™ reagent A.

The third stage of treatment involved the addition of ViroFresh™ reagent C, a product commonly used in wastewater systems to reduce BOD and precipitate phosphorus. ViroFresh™ reagent C is also a coagulating agent that helps clarify the treated water.

>>> CASE STUDY: QUEENSLAND ORGANIC RECYCLING SYSTEMS

The final stage of chemical treatment involved the use of ViroFresh™ reagent D as a final polisher to improve water clarity. ViroFresh™ reagent D was used as a final polisher to improve water clarity and visibility. ViroFresh™ reagent D was prepared in a mixing vessel and sprayed over the surface of the ponds. After some time any remaining suspended solids floc together and settle out leaving clarified water.



**Leachate Pond No.3
During Treatment with ViroFlow™ Reagent A.**

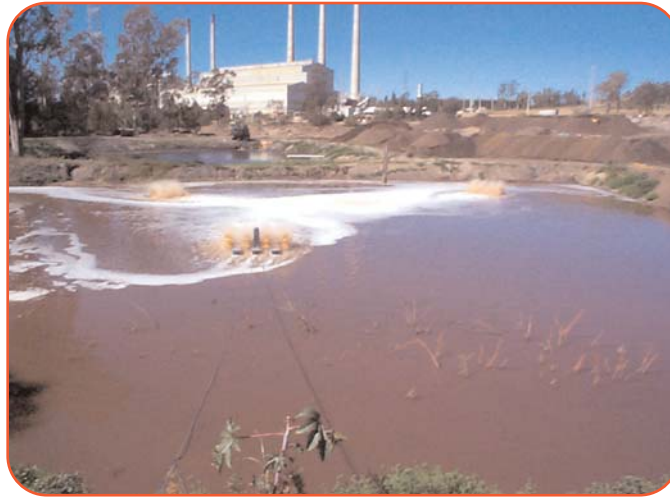
AERATION SYSTEM

The goal for the installation of the permanent aeration system was to maintain dissolved oxygen (DO) concentrations to ensure that biological activity in the leachate ponds remained aerobic.

The ponds required on-going management and treatment as fresh leachate continued to collect in them. The primary leachate pond (pond No.3) was converted to an aerobic pond by installing a series of aerators. This ensured that an aerobic blanket formed on the pond surface which would prevent odours from the lower depths of the pond from escaping.

Ongoing monitoring was performed to ensure that dissolved oxygen concentrations were maintained to ensure aerobic biological activity.

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**Aeration System in Pond No. 3.****RESULTS**

After treatment, the odours were eliminated from both leachate ponds. This outcome has been confirmed by both the manager of QORS and the Queensland EPA. On a scale of 0 to 10 (with 10 being the most objectionable odour), the EPA officer rated the odour generation from the leachate ponds to be 0, with no detectable odour. Treatment results are summarised in Table 1.

TABLE 1 – SUMMARY OF TREATMENT RESULTS.

Parameter	Leachate	Pond 2	Leachate	Pond 3
	Before Treatment	After Treatment	Before Treatment	After Treatment
Volume	200kL	200kL	2,000kL	2,000kL
Surface Scum	High	Barely Noticeable	High	Barely Noticeable
Odour Level	High	Not Detectable	High	Not Detectable
Clarity (Secci Disk)	0mm	120mm	0mm	300mm
pH	7.54	7.71	7.48	7.65

>>> CASE STUDY: QUEENSLAND ORGANIC RECYCLING SYSTEMS

The following figures show the visual appearance of the leachate ponds pre- and post-treatment.



Leachate Pond No.3 before treatment.



Leachate Pond No.3 after treatment.

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Leachate Pond No.2 before treatment.



Leachate Pond No.2 after treatment.

>>> CASE STUDY: QUEENSLAND ORGANIC RECYCLING SYSTEMS

CONCLUSION

The application of ViroFlow™ Technology at QORS was successful in eliminating odours and improving water quality in the leachate ponds.

The use of ViroFlow™ Technology to treat leachate wastewater ponds for odour has proven to be both environmentally sustainable and economically viable.

TESTIMONIAL

“Queensland Organic Recycling Systems (QORS) of Swanbank, Queensland are pleased to offer this testimonial for Virotec Global Solutions’ odour abatement strategies employed at our site.

In July – August, 2003 QORS’ sedimentation dams had turned anaerobic over time, resulting in obnoxious odours being released. On becoming aware of the situation QORS acted swiftly to engage an experienced company who had the know-how, expertise and technology to address the odour problems.

Virotec Global Solutions responded quickly on their appointment as consultant and contractor and carried out a series of treatments at the two ponds in question. The odours were eliminated. This action was followed by installing a surface aeration system to keep the holding ponds aerobic.

QORS has no hesitation in recommending Virotec to any organisation for the treatment of odours and we acknowledge their proprietary technology, know-how and expertise in dealing with such problems. The company displayed a high degree of professionalism and service orientation and were quick to respond to our every request and requirement. Their officers use a professional, scientific approach and obviously understand customer values and customer service very well.

We continue to engage Virotec in other treatment matters around our composting operations.”

JOHN HINDMARSH

Director

**Queensland Organic Recycling Systems
Swanbank, Queensland**

>>> CASE STUDY: QUEENSLAND ORGANIC RECYCLING SYSTEMS

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