A COMMERCIAL APPLICATION OF VIROFLOW™ TECHNOLOGY

CASE STUDY: HYNE TIMBER, MARYBOROUGH, QUEENSLAND, AUSTRALIA

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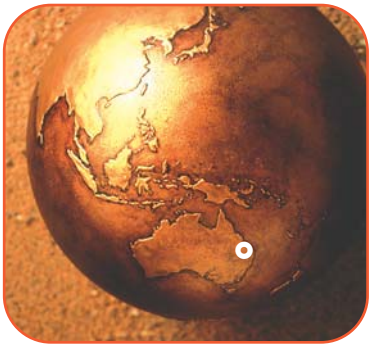

The Hyne timber mill is near Maryborough in Queensland, Australia.

PROBLEM

Hyne Timber operates a large-scale timber mill and treatment facility, near Maryborough, where levels of copper, chrome and arsenic (CCA) in the leachate interception ponds, located on site, had been exceeding Queensland Environmental Protection Agency (EPA) limits. The contamination issue required immediate and sustainable corrective action.

Hyne Timber was searching for a cost-effective technology capable of treating these CCA-contaminated leachate ponds. The objective was to both treat the leachate pond water to reduce CCA concentrations to below EPA (Qld) Guidelines, and to improve overall water clarity.

VIROTEC TOTAL SOLUTION

The solution involved adopting Virotec's ViroFlow™ Technology using proprietary reagent Viro-Bond™ reagent. The ViroFlow™ Technology treatment was a custom designed multi-stage treatment applied in three separate stages.

The implementation of ViroFlow™ Technology achieved the following outcomes:

- Elimination of a major environmental hazard, and a potential environmental incident.
- Treated water was released with copper, chromium and arsenic concentrations that were well below EPA Guideline limits.
- Fast mobilisation and treatment time.
- Customer satisfaction.

The ViroFlow™ Technology comprised the following elements:

- Initial full analysis and characterisation of the water;
- Chemical treatment of the contaminated water to remove CCA and improve water clarity;
- Validation of treated water quality;

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With the CCA treatment process, copper and arsenic protects timber from insect and fungal degradation. Chromium seals the copper and arsenic into the timber.

- Ongoing technical support; and
- Liaison with regulatory authorities.

BACKGROUND

At Hyne Timber's CCA treatment site, pine logs are debarked, steamed and treated, to produce preserved timber logs. About 650 000 cubic metres are treated at the plant per year, amidst the largest exotic pine plantation in Queensland.

Treatment of the logs begins with a steaming process that opens the cells in the timber. Once opened, these cells stay open, allowing a more effective impregnation. The chemical treatment used is known as CCA. Copper and arsenic protect the timber from insect and fungal degradation, and chromium is used to chemically seal the copper and arsenic into the timber.

After treatment, the logs are stored in a holding bay, where they are air-dried. Water containing CCA often seeps from the logs as they are drying. The leachate is contaminated with copper, chromium and arsenic and when it rains, it is washed into collection ponds at the back of the site.

As a result, water in the ponds is contaminated with arsenic, chromium and copper and is not suitable to release into the environment. Prescribed water quality standards imposed by EPA (Qld) must be met before the water can be released.

TREATMENT METHODS

The designed ViroFlow™ Technology treatment comprised of a 3–stage chemical addition as detailed below. Each pond was subject to a slightly different chemical dosing regime. The Virotec Total Solution ensures that each pond has a custom-designed treatment solution in order to meet discharge limits.

- ***STAGE 1: ViroBond™ Reagent A (pH Adjustment)***

ViroBond Reagent A was applied to adjust the pond pH and saponify any fats, oils and greases that were present in the ponds.

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Pond #1 after ViroFlow™ Technology treatment.

Reagent A was premixed in a mixing vessel and subsequently sprayed over the surface of the ponds. The chemical effect of the lime treatment is a rise in pH.

> *STAGE 2: ViroBond™ Reagent Part B Treatment*

ViroBond™ Reagent Part B compliments Part C and is necessary for effective coagulation of the leachate pond. ViroBond™ Reagent Part B is also an aggressive treatment for the removal of organics.

> *STAGE 3: ViroBond™ Reagent Part C Treatment*

ViroFlow™ Technology ViroBond™ Reagent Part C is Virotec's proprietary reagent for the treatment of copper, chrome and arsenic. ViroBond™ Reagent Part C effectively adsorbs and binds copper, chrome and arsenic from the leachate ponds. ViroBond™ Reagent Part C was premixed in a mixing vessel (see diagram below) 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, where metals were perm-anently trapped.

RESULTS

After treatment with ViroFlow™ Technology, the CCA levels were dramatically reduced in both leachate ponds. Treatment results are summarised in Tables 1 and 2 overleaf.

Application of ViroFlow™ Technology produced a remarkable improvement in pond water clarity. (Left:) Before treatment. (Right:) After treatment with ViroBond™ reagent.

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Analyte	Before Treatment	After ViroFlow™ Technology Treatment	EPA (Qld) Discharge Limit
pH	*6.8*	*7.4*	*6.5 - 8.5*
Copper (mg/L)	*0.205*	*0.02*	*0.1*
Chromium (mg/L)	*0.516*	*0.02*	*1.0*
Arsenic (mg/L)	*0.276*	*0.014*	*0.05*

Table 1: Leachate Pond 1 – Pond capacity: 3.0ML

Analyte	Before Treatment	After ViroFlow™ Technology Treatment	EPA (Qld) Discharge Limit
pH	*6.9*	*7.3*	*6.5 - 8.5*
Copper (mg/L)	*0.775*	*0.02*	*0.1*
Chromium (mg/L)	*1.33*	*<0.01*	*1.0*
Arsenic (mg/L)	*0.851*	*<0.001*	*0.05*

Table 2: Leachate Pond 2 – Pond capacity: 1.7ML

CONCLUSION

The ViroFlow™ Technology treatment was successful in reducing copper, chrome and arsenic concentrations to well below discharge levels and improving general water quality in the leachate ponds.

The ViroFlow™ Technology has proven to be a highly cost-effective treatment for contaminated CCA leachate ponds, and the technology can be rapidly applied for urgent treatments.

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TESTIMONIAL

"Hyne Timber was recently in need of an environmental solution for contaminated leachate ponds at one of our many treatment facilities. We were recommended to Virotec by a large timber processing company for whom Virotec had previously and successfully treated CCA contamination in leachate ponds.

Hyne Timber are continually on the look out for environmental improvements to adhere to the stringent environmental limits placed on our timber treatment plants – and when we were recently seeking treatment for our own ponds containing CCA leachate we approached Virotec.

The Virotec staff were friendly and, most importantly, totally committed to the urgency of our situation. Working professionally and diligently, they provided Hyne Timber with an effective and economic environmental solution. The Virotec staff also followed all site safety procedures.

Following the application of Virotec's ViroFlow™ Technology, the water quality of the ponds had CCA metal levels below the required Queensland EPA discharge guidleines. I also noticed that water clarity improved significantly after treatment.

I would have no hesitation in recommending Virotec to any other company who might have similar environmental problems, or a commitment to improving current practices."

DAVID LIGHTBODY
Corporate Risk Manager
Hyne Timber

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