

# That ain't heavy

Intec's technology to recover metals from wastewater can provide a zero-waste, low cost solution. By Garth Lamb.

There's wastewater, and then there's *wastewater*. It's probably not a good idea to start a game of "my problem's bigger than your's" with anyone managing the spent acid pickle liquor that's used to clean and prepare steel prior to hot-dip zinc galvanizing – they're odds-on favourite to have the most gnarly problems to discuss at a dinner party.

But in a project that could end up replicated across Australia's 30 or so galvanizing factories, Victoria's second largest player, GB Galvanizing Service (GBG), is looking to employ new hydrometallurgical technologies that will make its spent pickle liquor much easier and cheaper to deal with.

The strength of acid in the liquor depletes over time and the mixture picks up contaminants from the surface of the steel, particularly zinc and iron. Once spent, current practice sends the liquor for chemical treatment to stabilise it, ready for landfill disposal as a hazardous waste.

The traditional treatment process, based on precipitating the metals into a slurry before adding cement for stabilisation, requires the addition of 1.3 tonnes of reagent for every tonne of waste treated. That means 2.3 tonnes of waste is sent to landfill for every tonne of spent liquor.

Enter the Victorian EPA, which at its HazWaste Expo in November 2008 facilitated a meeting between GBG and technology provider Intec. The two parties have now signed a memorandum of understanding to build a dedicated facility and use novel heavy metal recovery technology that will provide GBG a zero waste outcome.

Intec's hydrometallurgical process, based on leaching, purification and electrowinning, will fully recycle the spent liquor and generate an iron product, a high-grade zinc metal that can be returned to the hot-dip galvanizing bath and refreshed acid pickle liquor.

On top of the obvious and significant environmental benefits, Intec says the treatment will come "at much lower cost than the current industry benchmark".

## Low cost, high benefit

The initial facility will be sized to take all GBG's IML of spent liquor annually, although during the engineering phase Intec says "consideration will be given" to expanding up to a 3ML annual capacity, enough to deal with all Melbourne's spent pickle liquor.

"Obviously we'll be pushing to say 'let's make it bigger' because bigger is better in the sense that your economics improve," says Intec corporate development manager Dave Sammut.

The total projected cost to design and build the initial facility is approximately \$2 million. While Intec is shy on revealing detailed economics just yet, the return on investment is likely to be very swift, especially if the application for partial funding through the state's HazWaste Fund comes off.

Treating IML of spent liquor – weighing 1,300 tonnes – will avoid the need to dispose of some 3,000 tonnes of waste. Given the levy alone for Class B prescribed industrial waste is \$250/tonne in Victoria, GBG will avoid levy costs of over \$750,000 annually, a nice saving.

On top of this primary economic



Electrowinning can recover high grade zinc.

benefit, Sammut highlights "a fair few additional knock on benefits," including no waste transport charges, no wastewater discharged to sewer and the fact that recovered metals offset the need for costly virgin materials in the galvanizing process.

With a compelling business case, Intec is hoping one successful demonstration project will quickly lead to deals with other galvanizing facilities, locally and overseas.

"It's a fairly big industry with fairly uniform problems [so] the application developed for this one location will be quickly applicable elsewhere," says Sammut.

More at [www.intec.com.au](http://www.intec.com.au)

WME

## FACT FILE

### Shrinking the stockpile

Automotive Components Limited (ACL) has signed a commercial wastewater treatment contract that will see it send some 100KL of heavy metal-bearing wastewater from its Launceston bearings plant for treatment at Intec's research facility at Burnie in northern Tasmania.

The stockpile has built up over 15 years because ACL had not been able to find an acceptable treatment technology. Using the Intec process, however, heavy metal products will be recovered as saleable commercial mineral concentrates (presently grading 20 per cent lead, 5 per cent tin, 2.5 per cent copper, 2.5 per cent nickel and 0.2 per cent zinc), which can be processed through to pure metals. The only other output is clear water that is suitable for discharge into the sewer system.

Intec claims its technology has "quite broad application for mine tailings water, industrial wastewater and waste sludge treatment, nationally and internationally".

Element	Conc. in waste feedstock (wt %)	Average recovery to product (%)	Clear discharge conc. (mg/l)
Lead	43	>99	<10
Iron	1.6	>99	<10
Copper	2.4	>99	<10
Tin	7.5	>99	<10
Nickel	8.7	>99	<10
Calcium	<1	n/a	9-10 g/l
pH	10-11	n/a	6-9