

# Metal pollution taints Shore shellfish

by Sebastian van der Zwan

North Shore beach-goers are being warned to avoid swallowing seawater and eating shellfish because of heavy metal pollution.

Auckland University of Technology scientist Percy Perera's study of heavy metal concentration in oysters has revealed high levels of zinc and copper pollution from North Shore estuaries.

"People can use these beaches for recreational purposes, but they must be careful not to swallow the water," he says.

Dr Andrea Alfaro, from the university's Earth & Oceanic Sciences Research Institute, agrees, and says that North Shore shellfish are probably "not suitable for human consumption".

Mr Perera says while these heavy metals do not harm oysters, they can accumulate in human tissue and may cause medical problems.

"There are a lot of reports from other parts of the world that heavy metals have harmful effects."

Zinc and copper enter the sea from estuaries containing storm water and run-off from cars, he says.

Zinc comes from galvanised iron used in roofing and spouting, while copper is used in various car parts including brake lining.

Mr Perera says heavy metal pollution on the North Shore has increased because of urbanisation and increased population density.

Reducing the use of private transport and treating water before it flows into estuaries or onto beaches could reduce pollution, he says.

Project supervisor Dr Alfaro is unsure how to reduce the North Shore's heavy metal pollution, but says it "comes down to management strategies".

"A good example was lead. Lead used to be a big problem in the Auckland region where there was lead pollution in the coastal areas. Unleaded petrol has reduced that substantially."

Mr Perera's study has found low concentrations of lead in North Shore oysters, but levels are often higher than the Food Standards safety guideline of two parts per million (ppm).

He has also found cadmium concentrations in Mahurangi are three times higher than the safe level of two ppm.

This is because of fertiliser run-off from the many farms in the area.

Mr Perera (47) came to New Zealand three years ago from Sri Lanka and has studied North Shore's Pacific oysters since last November.

Once a month the ex-high school science teacher collects oyster tissue from beaches in Milford, Murrays Bay, Waiake, Long Bay and Mahurangi.

Mr Perera grinds up the tissue, mixes it with acid and analyses it using an inductively coupled plasma atomic emission spectrometer that measures heavy metal concentration.

The Epsom resident also analyses



POLLUTED: Percy Perera collects oysters at Long Bay for his study of heavy metal contamination.

sediment collected from the estuaries that flow onto the beaches.

He hopes to find a link between the heavy metal concentrations in the sediment and oysters from the same area.

Bivalves, such as oysters and mussels, are known as bio-indicators of

pollution as the contaminants present in their tissue reflect those in their habitat.

Oysters accumulate heavy metals through filter-feeding and particle-ingestion, and can tolerate very high levels of contamination.

Pacific oysters (*Crassostrea gigas*) were accidentally introduced into New Zealand from Japan in the 1960s.

They are now commercially farmed and can be found in lower mid-intertidal zones on beaches throughout New Zealand.

## Power sags will prove no problem with Kiwi company's breakthrough

by Michael Otto

A New Zealand electronics company has discovered a way to correct mains power sags that can cause industrial processes to shut down, costing millions of dollars in lost production.

Domestic power consumers notice mains sags when their lights are dimmed for a short while because of temporary low mains voltages.

Vectek Electronics Ltd of Napier has developed an active voltage conditioner that can compensate for 80% of mains sags and correct for ongoing mains irregularities at the same time.

John Penny, marketing director at Vectek, says a conditioner can completely correct sags within 10 milliseconds (mS).

Typical transmission line faults, often caused by lightning and trees falling across lines, cause sags lasting 100mS, whereas major system faults can lead to sags lasting up to half a second, says Mr Penny.

Vectek is a small but growing company employing 30 staff, seven of whom are research and development design engineers.

The company is planning to target a potentially large US market for active voltage conditioner (AVC).

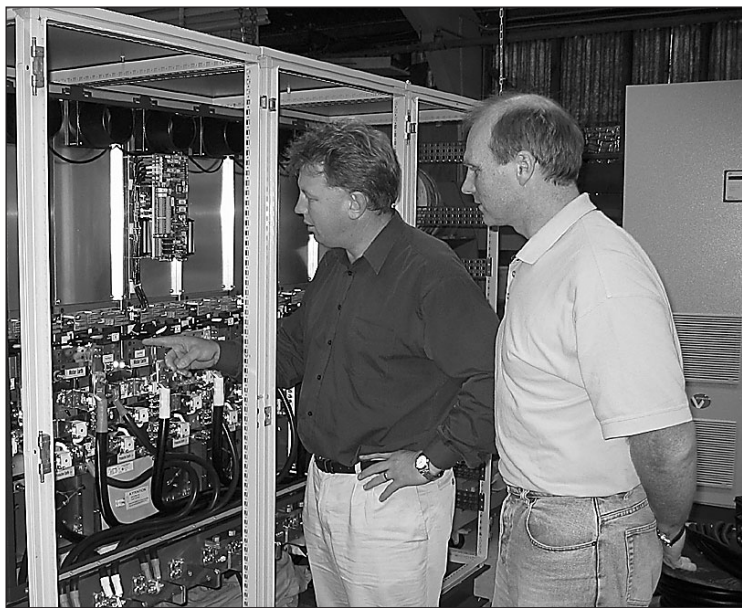
The recent blackouts in the north-eastern United States created supply overloads, which caused widespread voltage sags in nearby systems.

Mr Penny says Vectek's overseas distributors are telling him of a large increase in enquiries about their AVC from industries that want to improve power quality.

He estimates the potential market size for voltage conditioners as being several hundred million dollars.

"Estimating market size is difficult when there is no existing market. This is a very new product."

Rated up to 10MVA (megavolt amperes) in Vectek's range, a conditioner can prove its worth very quickly.



WIRED: John Penny, left, and Simon Walton check out an active voltage conditioner under construction at their Napier factory.

"A lot of applications in critical systems can pay for themselves in less than a year," says Mr Penny.

A 1.6MVA Vectek conditioner system installed at a solar panels factory in the USA paid for itself in this time, he says.

He adds that the semiconductor production industry is particularly suitable for voltage conditioner use.

Vectek research director Dr Simon Walton says: "A voltage conditioner will not compensate for total power blackouts though."

"However a voltage sag can be just as severe as a blackout for critical processes. The reality is a sag is not a minor event."

The traditional way of protecting against mains dips and other events has been to use an uninterruptible power supply (UPS), which stores energy from the mains in batteries.

The DC power in the batteries is converted back to AC power for the plant when needed.

UPSs are typically used in data

processing centres and other places where controlled shutdown of computer equipment is vital, says Dr Walton.

A voltage conditioner does not have full mains power running through it as in a UPS, nor does it have batteries, says Mr Penny.

Rather it sits to the side of the mains supply, adding in corrections where necessary.

The main difficulty with UPSs at very high power levels (over one MVA) is the batteries, says Dr Walton.

"Batteries are a big problem in terms of capital cost, space, maintenance and safety, and they also pose environmental problems when disposed of. Even with a UPS you will get a plant shutdown in a blackout unless you have a plant full of batteries."

Dr Walton says many power companies around the world have been deregulated, meaning they often spend much less on routine maintenance and replacement of equipment like transformers and insulators.

## Feelings run high at Opunake over plans for artificial surf reef

by Tulse Bramley

Environmentalists and residents are concerned information about a proposed artificial reef in Opunake is misleading.

The Opunake District Council has paid Artificial Reefs Ltd (ASR) to design an artificial surf reef to go on their local beach. The plans have so far cost around \$200,000. The reef will cost over \$1 million.

Stenen Pivac, an Opunake farm contractor, thinks the local council would be foolish to pay for an expensive reef that is not proven to work.

"There hasn't been one built yet that works. Why would a community like this risk it?"

The reefs are made from geo-textile bags that are placed in the ocean and filled with sand. Dr Shaw Mead of ASR says the sand bags form a reef that makes the waves break bigger, creating better surf.

Dr Mead says the geo-textile bags have many benefits.

"They are easily removable compared to other structures like rock or concrete. They cost at least half, or four to six times less than other materials. The material doesn't leach any toxins and they've got a design life of 40 years. The engineers say it will last for over 100 years."

Toby Hall, chief executive of the Opunake District Council, says he has been told the reefs will last 300 years.

"That's a load of absolute cobbler," says Queensland's Sunshine Coast Environmental Council president Daryl Fry.

"I know they improved the plastic, but if you ask for a guarantee, they absolutely will not give it to you."

Mr Fry says the material could live in the water for about 25 years before it breaks up and pollutes the ocean.

He says he got the information from a report by Soil Filters Australia.

A German company called Naue Fasertechnik makes the geo-textile bags. The firm is majority shareholder in Soil Filters Australia.

Mr Fry says there is big money in creating the reefs and he doesn't think

the advice given to local governments is independent.

"The material has a massive profit margin. I believe a conflict of interest exists between the consultants and the suppliers of plastic geo-textile. While officially representing themselves as independent consultants to local government, they are in fact aligned to the geo-textile industry."

Dr Mead says the placing of the reefs is important. The reefs are placed to the nearest degree, although they would still work even with a 25cm shift or stretch in material.

Dr Mead says he is not sure exactly how much the bags stretch. Only the engineers know that.

The average size of the bag is 20m long and 5m in diameter.

Mr Fry says the report by Soil Filters Australia says the bags stretch up to 60%.

Mr Hall says an artificial reef in Opunake would bring many benefits. "We want to create something that will create new jobs."

An economic and social impact report prepared for the South Taranaki District Council says that the reef will create \$100,000 revenue from visitors to the region in the first year.

Mr Pivac doesn't believe that the reefs will bring in money.

"I don't believe it will bring in thousands of dollars in. Not for an instant."

Mr Mead says that the reefs provide surfers with up to three times more surfing days a year.

An Opunake surfer says that Opunake already has world-class waves and people will eventually come.

"Yesterday was one of the best surfing days. I surfed by myself all day. There are world-class waves and no one on them. This town is a goldmine anyway. It will happen naturally."

The only completed artificial reef is at Narrowneck beach on Australia's Gold Coast. Mr Fry says the reef does not improve surf in the long run.

"The reefs work for a couple of years before they stretch and the surf turns to muck."