



### ONE OF THE LARGEST MOTORWAY UPGRADES EVER UNDERTAKEN BY A STATE GOVERNMENT HAD HIT A SNAG.

*The road works were taking place near many historic underground mine shafts and workings and these were filled with contaminated groundwater. Approximately one million litres of this groundwater had to be extracted and stabilised every day.*

This then is the story on how a tricky problem was innovatively solved so that in the end, there was no waste at all and the government may even have made some money.

#### WATER WATER EVERYWHERE

The groundwater was problematical. The water in the mine shafts had a high dissolved salt load and this is easily fixed. You just take the groundwater and pass it through a reverse osmosis system.

The trouble was that the groundwater also had a low pH and high heavy metal loading and reverse osmosis systems cannot handle heavy metals or a low pH.

Then there was the problem of what to do with the water.

#### INNOVATION WINS OUT

Thinking caps went on with what to do with the

water. The suggestion was made and all agreed, to use the treated water for the nearby concrete batching plant which supplied concrete to the motorway construction project teams.

This would complete the water recycling loop for the entire construction project.

But the heavy metal and low pH issue remained. There was a need to find a suitable pre-treatment methodology for the reverse osmosis system.

#### WE GET TO WORK

Virotec heaped the soil into 2,000 cubic metre piles which were then aerated by turning them over with an excavator. The piles were then irrigated on a regular basis to optimise the dispersion of the reagent and to provide the microbes with optimal growing conditions.

Composite samples were taken and analysed from both treated and untreated piles at monthly intervals.

#### VIROTEC SAVES THE DAY

Prior to Virotec coming on board, several types of pre-treatment technologies to remove the heavy

metals had been considered, including the use of caustic soda and flocculants.

Bench trials had shown that conventional alkaline and flocculent technology was not suitable in removing the heavy metals to suitable levels - another technology was needed.

Virotec had successfully demonstrated in laboratory trials, that one of its proprietary reagents was a great alternative for heavy metal and suspended solids removal and pH optimisation. It was also cheaper when compared with other treatment methods such as flocculants.

All parties subsequently chose Virotec's suggestion as the preferred pre-treatment method for the full scale implementation of the groundwater treatment.

The technology was proven. It was now up to Virotec to provide the infrastructure to make it happen.

This was achieved by supplying the reagent in a powdered form and then mixing it into a slurry via an automated dosing system. The slurried product was added to the contaminated groundwater to adjust the pH and to remove the heavy metals in the primary clarification unit.

Once the reagent particles had settled, the supernatant water was fed to an ultra filtration system and then to the reverse osmosis treatment system.

### **CAN WE MAKE GOOD CONCRETE?**

After treatment, the pH of the feed water supplied to the reverse osmosis treatment system and concrete batching plant was neutral, which is an absolute necessity.

But the best results came with the heavy metals and suspended solids. The heavy metals were reduced by a factor of ten thousand and the suspended solids by two hundred. Well within the reverse osmosis treatment system and concrete batching plant requirements.

The treatment times were substantially reduced and if the groundwater was accidentally discharged, it could be collected and treated, eliminating a major environmental hazard.

*The Site Operations Manager said "Virotec helped us out of a bind that we could not solve. Their solution was cost effective, decreased the maintenance costs and increased the working life of the treatment equipment and met the EPA requirements."*

*And finally and most importantly, the treated water could be completely used in the concrete batching plant. All up, no waste, less cost and we may have even made some money".*



**FOR YOUR FREE SITE AUDIT, PLEASE CALL VIROTEC TODAY ON 1300 660 460**