



## LETTERS TO THE EDITOR

**Orange River Floods**

I would like to tell you how much I have enjoyed your articles in the January/February 2006 issue of *the Water Wheel*. Your stories are well-presented and brimming with topical matters of interest. Keep up the good work. Keep it simple.

The floods, which the Witwatersrand has recently experienced, will do an enormous amount of good in flushing out the river systems. Loch Vaal on the Barrage Reservoir (53 km of stored water) is so contaminated that from time to time it is declared by Rand Water unsuitable for water contact sports. You are then warned by Rand Water not to put your toe in it!

Fortunately Rand Water no longer draws any of its water from Loch Vaal. It supplies its Vereeniging purification plants direct from Vaal Dam via a canal (on the east bank of the river) built about 20 years ago.

I thought that your reading public might be interested in information regarding Orange River floods, which I put together in 2001. It is historical, but at the same time relevant.

Intensive and widespread rains in the Orange/Vaal catchments seem to recur at intervals of ten to fifteen years, and when abnormal rain patterns in the respective catchments coincide, the phenomenon generates an enormous volume of water.

The Vaal joins the Orange at the small village of Bucklands near Douglas in the Northern Cape. Bucklands is 800 km downstream of the Vaal Barrage at Vereeniging. When flood waters from both systems converge at Bucklands, no man-made barrier would be able to contain the vast volume and the impetus of the river force. At the peak of a high-intensity Orange River flood, the chocolate-coloured tumbling water will carry some 250 000 t of silt downstream every hour.

From Bucklands the silt-laden flood water races through the river valley for 200 km to Prieska, then sweeps north-west a further 200 km to surge in a wall of water over the Boegoeberg River Barrage, and then onward a further 100 km to Upington.

Leaving the green vineyards in its wake the flood pounds through the lower Orange region for 500 km and, having taken the Augrabies Gorge in its stride at 6 000 m<sup>3</sup>/s, the end of the irrigation line is reached at Vioolsdrif.

And then, on the final leg of its epic journey, the flood water races past the junction of the Orange River and Namibia's deeply incised Fish River Canyon, through the foothills of the desolate and forbidding Richtersveld

Mountains to finally spill into the river estuary at Alexander Bay and then into the Atlantic Ocean.

Some of the flood water would have travelled over a river reach of more than 2 000 km. A register of the occurrence of high-intensity Orange River floods over the past 126 years is maintained by the Upington museum. It makes for interesting reading.

During the high-intensity flood of the Orange River in 1988, some 26 000 million cubic metres of water flowed into the Atlantic over a period of six weeks. This volume is equivalent to eleven years of normal water usage in the Lower Orange. The 1988 flood would have filled the giant Gariep Dam five times over.

During February 1996 a volume of water equivalent to the total capacity of the Vaal Dam (2 600 million cubic metres) passed through the dam in a period of 16 days, and it is estimated that during the full 1996/97 summer season some 4 500 million cubic metres of Vaal water flowed unutilised via the Orange River into the Atlantic Ocean.

Not all floods in the Orange River system originate above the Gariep and Vanderkloof dams. There are rare occurrences of more localised floods. In the major flood of March 1925 a significant proportion of the flood water was generated below Hopetown i.e. below the present Vanderkloof Dam. The flood of March/April 1961 was largely generated downstream of Prieska owing to widespread rains in the Karoo.

**AH Charnaud, Howick**

*(The letter has been edited – Ed.)*

**Package plants – technology not the problem**

The fact that package treatment plants (PTPs) are finally under the microscope (*the Water Wheel*, January/February 2006 edition) makes for interesting reading. Finally, this contentious issue is getting the attention it so rightfully deserves.



*The Vaal Dam at more than 100% full.*

Sadly, the research itself is already flawed, in that it is based on three different types of "package plants". The definition of a PTP is that it is manufactured off site, it is sealed, and that it requires very little civil work. And that it is simple to operate and maintain. All PTPs require the septic tank for anaerobic predigestion, and not just settling and grit removal, as is in the case of this research programme. If this anaerobic process is not in place, the aerobic (and then nitrification/denitrification) phase becomes less effective. Both rotating bio-contactor, and activated sludge systems do not meet this criteria. And if equipment supplied to Darville was any different to the many already in service, then the results would also be different.

The notoriously high failure rate of PTPs is compounded by the attitude of the authorities. An example where Neil Macleod (Durban Metro) recently lifted the ban on new installations despite many old ones not working, and another in that Lin Gravelet-Blondin (Department of Water Affairs in KwaZulu-Natal) believes that all 64 failed PTPs within Durban Metro alone, "are not a disaster they are made out to be" (*Sunday Tribune* of June 6, 2005). One wonders who the authorities really are.

The high failure rates of these systems cannot be blamed on the technology, as sewage has been treated in the same way long before man arrived. We should rather look to the way we adopt this technology – the method we apply it within our designs – to find the answers. Our own research, done over a period of 6 months on live systems revealed some interesting facts. Air blowers without ventilation, tanks without drain/desludging valves, chlorine contact tanks with drain lines directly to the septic tank, and tilting clarifier launders, are just a few noted design/engineering

flaws. One supplier claimed that sewage had changed in 5 years and that is why his systems had failed (implying, possibly, that his design is 5 years out of date and/or that for 5 years the product has been marketed with a known flaw). Another supplier suggested that commissioning could take up to 2 years, and that the PTP be allowed to discharge for this period. The real reason these systems fail is those that supply equipment either don't know any better, or don't care.

The Umgeni team also suggests that the regulators ease the standards. A year ago, the ammonia limit was dropped from 3 mg/ℓ to 6 mg/ℓ, and not one of the existing failed systems passed the new limit. In fact, should the level be relaxed even further to 25 mg/ℓ, only 7 addition systems would pass this environmental threshold. The fact is that 5 known systems that were shut down, had no bearing on environmental impact, but were health hazards. Relieving these plants (and their suppliers) of their duties to perform would have the same effect as the current value of Matric school leavers.

There can be no doubt; the future of the package plant is guaranteed. When consumers put value to water (and wastewater) then more good products will see the marketplace. And then, there will no longer be any place for ignorance and arrogance.

**Steve Nicol, Scarab Technologies, Durban**

### **Lack of maintenance causes pollution**

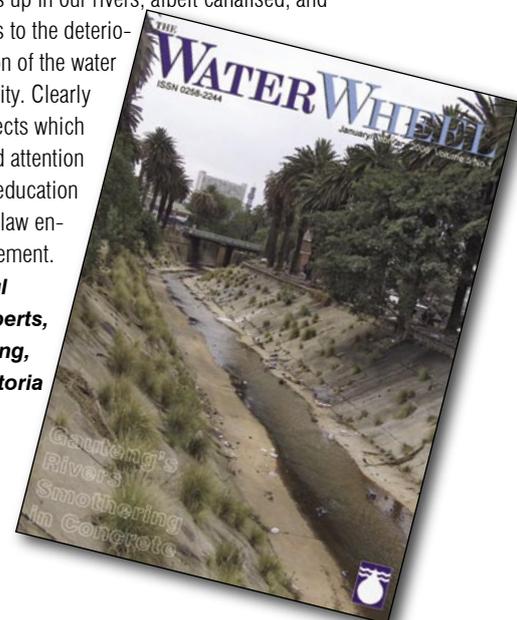
I refer to the cover photograph of the January/February edition of *the Water Wheel*. The photograph shows a portion of the canalised Apies River passing through Pretoria. While such a concrete structure may not be

attractive, it does clearly illustrate the lack of maintenance of our water infrastructure and the pollution of our water.

The Tshwane local authority has clearly not undertaken any maintenance of this canal for a number of years as evidenced by the growth of vegetation between the joints of the concrete slabs. In addition many of the slabs are badly cracked and deterioration has taken place. The canal lining shows a high potential for failure during a major flood. Maintenance of existing water infrastructure is essential and adequate funds should be set aside for this purpose.

The picture also illustrates the amount of solid waste which has been thrown into the canal. The litter on the bank where the people are congregated also indicates the lack of enforcement of anti-littering legislation. Probably a lot of solid waste also enters the canal from the storm water inlets along roads as people (including municipal cleaners) use them for disposal of waste. All of this waste ends up in our rivers, albeit canalised, and adds to the deterioration of the water quality. Clearly aspects which need attention are education and law enforcement.

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