Executive summary:

At present, raw aqueous textile effluent produced by textile mills in Hammarsdale, KwaZulu-Natal is reticulated voluntarily to the Hammarsdale Wastewater Works owned by the eThekwini Municipality and operated by Ethekwini Water and Sanitation. Thereafter the treated effluent is discharged into the Sterkspruit River which flows into the Shongweni impoundment. The cost to these textile mills of treating this effluent is calculated using a trade tariff formula administered by Ethekwini Water and Sanitation.

In principle this arrangement is governed as follows;

- in the case of the textile mills, by Sewage Disposal Bylaws set by Ethekwini Water and Sanitation, and
- in the case of Ethekwini Water and Sanitation by a licence issued by the Department of Water Affairs and Forestry in terms of the National Water Act 36 of 1998. This Act prescribes a General Effluent Standard which specifies the quantity, quality and temperature of treated effluent which may enter a defined water resource such as the Sterkspruit River.

In practice however, the Hammarsdale Wastewater Works is not licensed by the Department of Water Affairs and Forestry and operates temporarily according to an Exemption Permit issued to Umgeni Water who owned and operated the Hammarsdale Wastewater Works until 2003. It is thus incumbent upon Ethekwini Water and Sanitation to obtain a licence from the Department of Water Affairs and Forestry in order to comply with the requirements of the National Water Act and be allowed to operate the Hammarsdale Wastewater Works on a permanent basis.

However, because of design limitations, the Hammarsdale Wastewater Works cannot remove the visible colour continuously and reliably from incoming raw textile effluent. The consequence of this is that the Sterkspruit River is often contaminated by coloured discharges from the Hammarsdale Wastewater Works.

In terms of the National Water Act this situation is illegal and must be remedied.

The approach adopted by Ethekwini Water and Sanitation has been to amend the Sewage Disposal Bylaws to oblige the textile mills (by the use of permits), by certain dates, to remove all, or most of the colour (to specified levels according to the test method used) from their effluent before it will be admitted to the Hammarsdale Wastewater Works for disposal. The costs of compliance will have to be borne by the individual textile mills.

This business case study explores the impact of this obligation on the business of Textile Mill A and examines solutions to the problem. After a review of the efforts of that company to conform with the concept of Cleaner Production, it was decided to perform an end-of-pipe effluent treatment trial using a skid mounted pilot-plant utilising an adsorption and flocculation mechanism followed by cold soda ash softening, 'polishing' through a column of granular activated carbon and the removal of calcium and magnesium through a cation exchange softening column.

The results obtained were;

- that the permit requirements of Ethekwini Water and Sanitation could be met,
- that a financial 'break-even' point could be achieved at the start of the project in 2005 should 43% of the treated effluent be recovered for reuse,
- that a realistic rate of water recovery would be 50% resulting in a positive contribution in present day terms (2004) of R65 000 in 2005 increasing to R1 377 000 in 2014,
- that this rate of recovery could be increased should a demineraliser be introduced into the treatment train, and
- that the project could be financed by a vendor on a Build, Own, Operate and Transfer basis with transfer of ownership to Textile Mill A occurring after 5 years.

The results of that trial showed that end-of-pipe effluent treatment is a viable option, technically and commercially, for Textile Mill A considering the current inclement trading conditions being experienced by the South African textile industry. It is also a means of assisting Ethekwini Water and Sanitation to comply with the requirements of the National Water Act.