

## NangYang Effluent Treatment Proposal

### Overview

The Nang Yang Factory uses up to 6.5 Mega litres (6,500,000 million litres), of water per day in its yarn and fabric dyeing process. This water is sourced mainly from river water and supplemented by bore water.

The river water varies in quality with TDS levels ranging between 300 ppm to 13000 ppm with varying degrees of salt, sediment, suspended solids and organic matter, depending on the season and the tidal range. This water undergoes extensive treatment to make it suitable for use in the dyeing process.

This treatment involves sediment removal by flocculants and long chain polymers, chlorination for disinfection purposes, further filtration by sand and carbon filters and resin bed softening. This involves a hefty daily financial cost in terms of chemicals such as flocculants and long chain polymers, chlorine dosing, and up to 8 tons of salt per day to recharge the resin beds of the softeners. The result is a water supply of varying quality with improved water clarity and reduced hardness but with a TDS very similar to the incoming water supply.

The bore supply has average TDS levels of around 1000 ppm which is usually higher than the river water but is more consistent.

All of this water finishes up as effluent water after going through the fabric dyeing, washing and finishing process where a significant quantity of chemicals have to be used including, detergents, bleaches, dyes, neutralizing agents, fixers, and fabric softeners on top of the salt used in the dyeing process. Much of these chemicals finish up in the effluent ponds which poses a challenging remediation and disposal problem, especially as the temperature of the effluent water is high.

Following a presentation of Hydrosmart's chemical free water treatment technology, it was realized that significant improvements could be applied at most stages of the factory process, including water treatment, production and treatment of the effluent, all of which could result in a significant reduction in the operating costs and a large reduction in the amount of chemicals needed.

As the effect of Hydrosmart technology on the dyeing process was unknown, it was agreed that 100 mm Hydrosmart demonstration system, should be set up on part of the effluent equalization pond, into which all of the factory process water is channelled prior to being pumped to the two effluent aeration and remediation ponds.

## Equalisation Pond Hydrosmart Trial

The 100mm Hydrosmart system set up in circulation on the 31<sup>st</sup> of August is only about 15% of the treatment that would be required for effective remediation of the effluent but would be sufficient to show changes in the effluent equalization pond to demonstrate the potential of the technology.

The unit showed significant changes to the equalization pond and some smaller changes to the two larger remediation ponds downstream of it. These changes include:



Fig. 1 Treatment

- A reduction in odour from all three ponds
- The progressive breaking down of sludge from the equalization pond
- The progressive breaking down of sludge from remediation pond A
- A significant reduction in chloride levels in the equalization pond
- A reduction in Sulphuric acid dosing in the equalization pond from 18 containers per day to 5 containers per day.

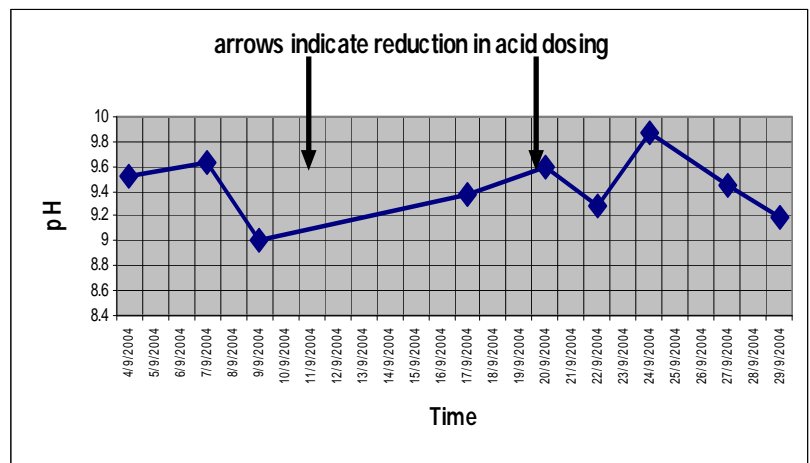


Fig. 2 Sludge in equalization pond



Fig. 3 Sludge in pond A

The sulphuric acid is used to try and lower the pH levels which have been around pH10. The big reduction in Sulphuric acid dosing has not had any adverse effect on pH levels which have actually reduced to 9.5 or less and on days when large amounts of chlorides levels have entered the pond, during the process, the pH has been as low as 7.5



## **Trial Set Up**

At present, Hydrosmart treatment is only being applied at the farthest end of the equalization pond just prior to the sump from where the water is pumped to the remediation ponds. Only 15% of the water that enters this is passing through the Hydrosmart System so the treatment is minimal.

## **Recommended Hydrosmart Set Up**

It is now important to set up a second 100mm circulation in the equalization pond in order to apply the treatment at the point where the effluent enters the pond where the Sulphuric acid is currently being dosed. This will allow the acid dosing to be turned off completely and provide an even better level of treatment applied at the source of the problem.

It is also important that two Hydrosmart 150mm systems are installed at the point where the effluent water enters the two large equalization ponds (see diagram below) so that the real potential of Hydrosmart Technology can be achieved. At present, EMF's from the 6 transfer pumps and power cables running alongside the effluent pipe, cancel out most of the treatment allowing only a small percentage of residual treatment to get through to the 2 remediation ponds. By applying a Hydrosmart System 150 at the point where the effluent enters these ponds effective treatment can be applied where it is most needed.

## **Reduced Aeration Costs And Improved Water Clarity**

This should make the aeration process unnecessary and save a large amount of energy. It will also reduce the chlorides to a very low level and allow a much higher level of aerobic activity, (at present there is very little in the remediation ponds but a much higher level in the equalization pond where some Hydrosmart treatment is being applied. Normally it would be the other way round). The increase in aerobic activity and the tiny particle size produced by Hydrosmart treatment will make the dye particles small enough for bacterial digestion to take place and when this occurs, water clarity will steadily improve. This will then become suitable for reticulating through a reed bed system which are able function 3-4 times more effectively with Hydrosmart treated water. and this will make the effluent water suitable for re-use and convert what is now a disposal problem into a resource.

## **Cost Effective And Environmentally Friendly**

All the above can be achieved by technology that requires no maintenance uses no chemicals and runs on less than 600 TBht of electricity per system per year.

# Hydrosmart Effluent Treatment Installations

